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EXAMINER	
KALINOWSKI, ALEXANDER G	
ART UNIT	**PAPER NUMBER**
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DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Requirement for Information Under 37 C.F.R. '1.105

1. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

2. The information is required to identify products and/or services embodying the disclosed subject matter of evaluating intangible assets. The Examiner upon conducting a search for prior art, discovered a web site for ProGrid Ventures (a copy of the information is attached to this request). Included within the information at the web site is an article titled "Measuring Intangibles – The ProGrid Story" by C. W. Bowman which is dated 1999. The article, on page 8, discloses the development of ProGrid tools over the past eight years. The article indicates that several tools were developed prior to the priority date of the instant application including ProGrid-RO from 1991-1993, Progrid-TA from 1993-1994, ProGrid-UN in 1994, and Progrid-CO in 1995. In response to this requirement please provide any known publications, brochures, manuals and press releases that describe the ProGrid products or services that were available or known to

the public prior to 1995 as described by the ProGrid web site and specifically the tools listed above that were developed from 1991 – 1995.

3. The fee and certification requirements of 37 C.F.R. 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 C.F.R. 1.105 that are included in the applicant=s first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 C.F.R. 1.105 are subject to the fee and certification requirements of 37 C.F.R. 1.97.

4. In responding to those requirements that require copies of documents, where the document is a bound text or a single article over 50 pages, the requirement may be met by providing copies of those pages that provide the particular subject matter indicated in the requirement, or where such subject matter is not indicated, the subject matter found in applicant=s disclosure.

5. The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained will be accepted as a complete response to the requirement for that item.

6. This requirement is subject to the provisions of 37 C.F.R. '1.134, 1.135 and 1.136 and has a shortened statutory period of 2 months. EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Kalinowski, whose telephone number is (703) 305-2398. The examiner can normally be reached on Monday to Thursday from 9:00 AM to 6:30 PM. In addition, the examiner can be reached on alternate Fridays.

If any attempt to reached the examiner by telephone is unsuccessful, the examiner's supervisor, Joseph Thomas, can be reached on (703) 872-9306. The fax telephone number for this group is (703) 872-9306 (for official communications including After Final communications labeled Box AF).

Hand delivered responses should be brought to Crystal Park 5, 2451 Crystal Drive, Arlington, VA, 7th Floor, receptionist.

Alexander Kalinowski

Primary Examiner

Art Unit 3626

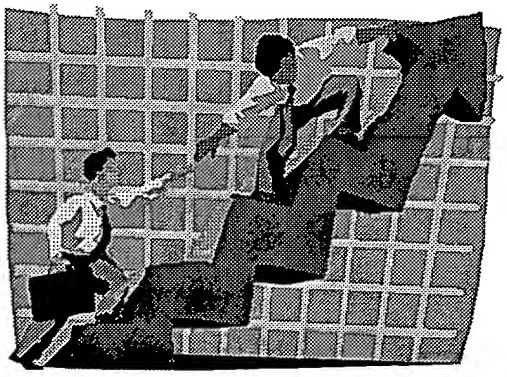
2/6/2005

ProGrid™
Ventures Inc.

Measuring Intangibles

The ProGrid® Story

C. W. (Clem) Bowman



Measuring Intangibles

Measuring intangibles can be considered to be an oxymoron. The Concise Oxford dictionary definition of an intangible is "that cannot be grasped mentally"

Nevertheless, intangibles are frequently far more important to organizations than the tangible assets that we buy, build and use in daily life.

This manuscript tells the ProGrid® story, one attempt to put a measurement framework around "that Accountants are not able to count"

C. W. (Clem) Bowman

December 8, 1999

Foreword

ProGrid represents a paradigm shift in transforming organizations. It is recognized as the leading concept in tackling the difficult issue of the effective management of intangibles.

The future value of an organization lies both in its codified intellectual capital and its advanced systems and processes for doing business - business with suppliers, customers, the public, governments and a myriad of other important stakeholders. The human capital of an organization represents a critical component of the intangible power of an organization. Unlike tangibles, intellectual assets do not depreciate over time but are normally only realized over the fulfillment of time.

ProGrid provides the framework for addressing the management of intangibles using unique tools that are customized to meet the values, priorities and expectations of individual organizations.

The ProGrid system has evolved over a period of eight years in response to defined user needs. It has been developed by a core of experienced technology and business managers. The breadth of application has been greatly expanded by two dozen initial users who have added their own innovative concepts to the basic tools. Clem Bowman has captured the story of this evolution from initial conception to the current widespread application of the ProGrid system.

What you will read in this manuscript is the tip of the iceberg. ProGrid is still evolving at a breathtaking pace. The excitement that has been generated over ProGrid will certainly continue as we enter the new millennium. We plan to issue periodic updates to this manuscript to demonstrate how ProGrid is being applied as a new thought process in capturing the intellectual power of organizations.

J. R. (Ron) McCullough

on behalf of

ProGrid™ Ventures Inc.

Acknowledgments

To ***Ron McCullough***, who believed in the vision, who extended the tools, and who sold ProGrid products before they were built,

and to many other colleagues, in the order that they appeared on the ProGrid scene:

Jac van Beek and Garry Sears, who sought the initial markets and toiled on many of the initial assessments;

Clarke Henry, Dave Shaw and Len Carry, who with good humour helped with self-assessments using the early versions;

Marjorie Bowman, who edited a steady stream of ProGrid-TA reports;

Gerald Dyer, who knows why technologies/products/companies fail and helped introduce the future forecast methodology;

Gregor Robinson, who established the first commercial ProGrid venture and "worked" the Banks;

Peter Cawood, who upgraded the Language Ladder of several new tools and introduced the tool "Down Under";

Peter McGeer, who continually presented new challenges and sharpened the tools for the Centres of Excellence;

Alan Winter, who provided an initial challenge through CRMA, and who has come back into the fold;

Bruce Fountain and Joan Johnson, who helped introduce the concept of abbreviated tools, the ProGrid-Quicks;

Grant Allan, who brought new meaning to the third rung of the Language Ladder;

Ian Rowe, who pushed the technical boundaries and saw applications outside S&T;

Calvin Stiller, who opened up the Venture Capital market and first coined the term ProGrid Inc.;

Peter Day, Glen Smeltzer and Paul Johnson, who hold the ProGrid-TA use record;

Fred Christie, who tried it once in space and became addicted;

Bob Church and Ian Strang, who saw the inter-institute power of ProGrid, for communications and technology transfer;

Rob McLean, who strengthened the link to intellectual capital;

Duke Duplessis, who helped formulate a ProGrid tool for SMEs and managed the first ProGrid international benchmarking project;

John Kramers and Dale Homeniuk, who helped open up Western Canadian markets and with magic created the advanced software;

Lise McCourt, who made it all work;

... and many users, known by name and deed, who have put their own innovative stamp on the ProGrid tools;

...and ***Ann and John***, who led the selection process for the name "ProGrid", after eliminating GridMan and Grid-O!

My deep gratitude to all
Clem Bowman

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Chapter 1: The Importance of Intangibles

1.1 Introduction

Accountants have ruled the commercial world for most of the recent history of modern industrial development. This is not surprising in view of the adage "What cannot be measured, cannot be controlled". In the past, tangible assets were assumed to represent the majority of the wealth of companies. These were readily amenable to accurate assessment or "bean counting", to use a somewhat derogatory expression. The accountants' view of the world has been an important feature of national and international commerce. Their metrics have provided the framework for transactions among commercial enterprises.

It has been realized in the last few decades that tangible assets were only one part of the wealth of a company or a nation. The book value of a company frequently has badly represented its strength, either by overlooking future potential or, in some cases, exaggerating its value by assuming unrealistic longevity of its current manufacturing processes and products.
Of the Fortune top 500 companies in the first listing in 1954, 360 would not appear in a similar listing of industrial companies today.[1] Would better knowledge of the strength of their intangible assets have predicted their demise?

Intangible assets are difficult to measure. But many intangible things in life are intuitively measured and compared against a preset standard of performance. Selecting one's spouse is often used as an example.

There is an important distinction between tangible and intangible assets. Tangible assets tend to have an intrinsic value independent of the observer. The value of intangible assets, however, depends in large measure on the values, priorities and expectations of the observer.

There is another distinction- a dimensional issue, one of time. Many tangible assets devalue over time. Intangible assets often realize their value only over time. This unfolding time dimension requires an examination of value over more than one dimension, as will be seen as our story unfolds.

This document describes the evolution of a methodology to measure intangibles, called ProGrid®[2]. It is "a work in progress" in the sense that current users are evolving it to fit a variety of organizational goals.

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[1] Forty Years of the 500, Carol J. Loomis, Kathleen C. Smyth, Suzanne Barlyn, Volume 131, No. 9, 40th Anniversary Issue, page 182

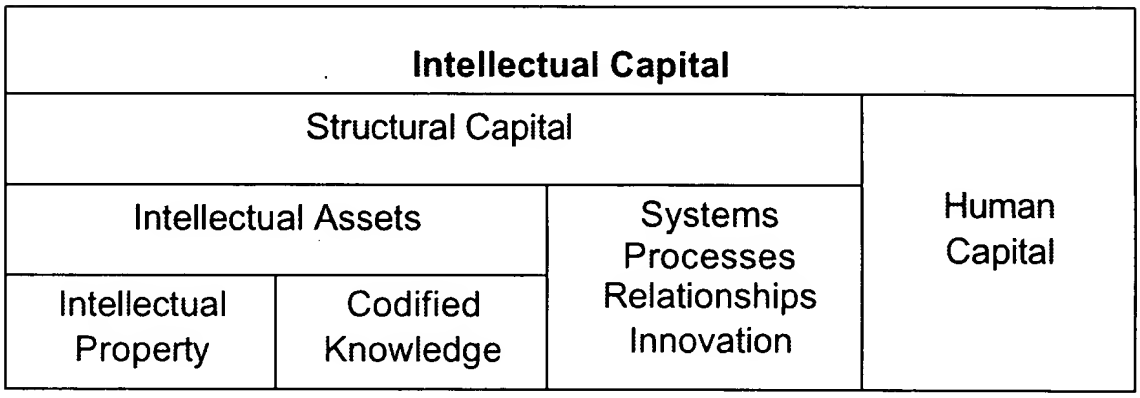
[2] ProGrid® Trademark registered US # 2,176,193, Canada # 487,130

This Chapter 1 describes some of the features of intangible assets and the more precisely defined term of intellectual capital and presents the challenge of establishing a measurement framework.

Chapter 2 outlines the very useful and relatively brief customized tools that are used to assist in making selections from alternative choices. Chapter 3 presents some of the principles and underpinnings of ProGrid and describes how the system has evolved to its current structure. Chapters 4 to 7 describe set-piece tools that are used for benchmarking and auditing purposes. Chapter 8 illustrates how the ProGrid methodology can be used outside the technical/scientific area, opening up unlimited possibilities for wider scale application.

1.2 Intellectual Capital

The intangible assets of an organization are often referred to as intellectual capital. The components of intellectual capital are shown in the following chart.[3]



Intellectual property is comprised of legally recognized knowledge, such as patents, trademarks, etc. Codified knowledge is knowledge that exists in a form that enables it to be shared with others, in the form of documents, drawings, software, etc. Intellectual assets are the sum of intellectual property and codified knowledge. Structural capital is understood to comprise intellectual assets, plus the organization's systems, processes, key relationships (such as those with customers, business partners and suppliers), and innovative capacity. The components of structural capital are sometimes referred to as customer capital, organizational capital, process capital, innovation capital, etc. The sum of structural capital, and the knowledge, skills, capabilities, and motivation of its people (often referred to as human capital) constitutes an organization's intellectual capital.

The following chart, developed by the Alberta Research Council[4], illustrates the dynamic relationships among the individual components of intellectual capital.

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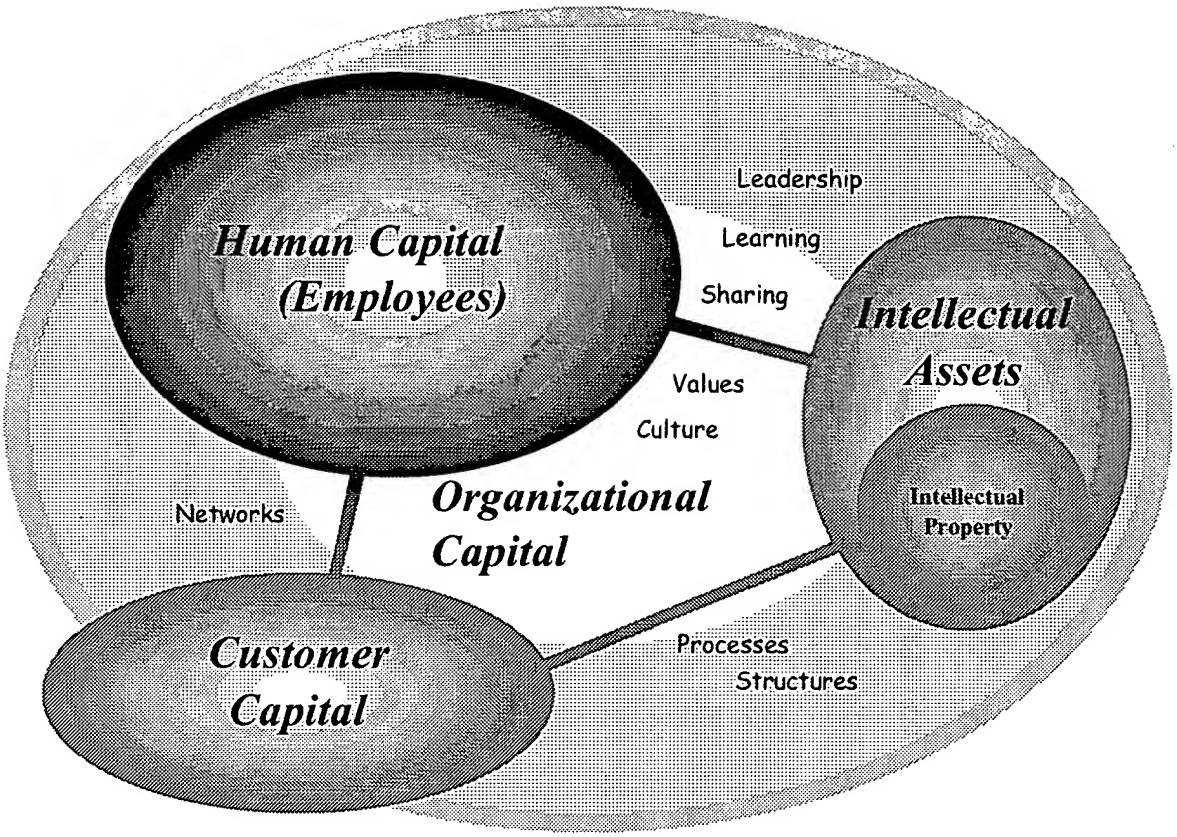
[3] Source: Skändia, ICM Group, Saint-Onge, Matrix-Links etc.
[4] Alberta Research Council Annual Report, 1999

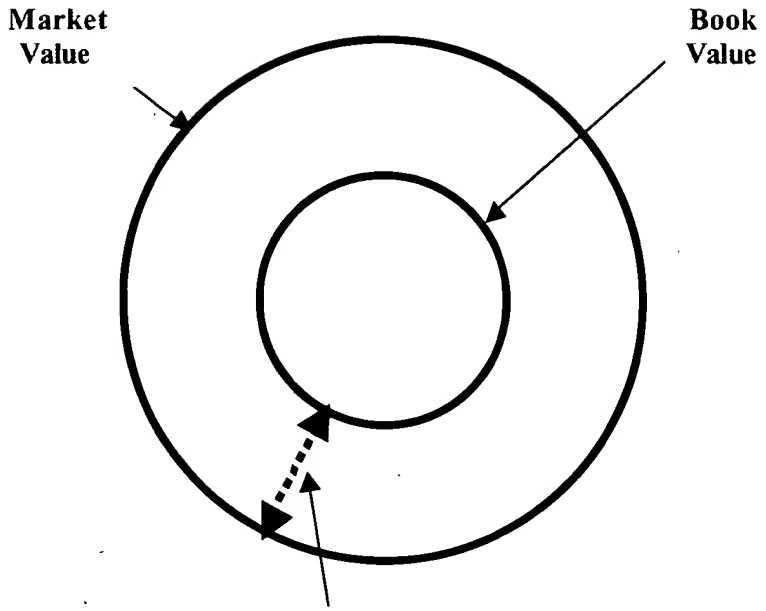


Is it possible to measure the value of each of these components of intellectual capital? Most organizations, in fact, still operate at the level of intellectual property. There are, however, a group of industry and government leaders who are active in developing both the definitions of the other elements of intellectual capital and the frameworks within which these can be measured and tracked over time.

Approaches for tackling this task are described below.

1.3 Measuring Intellectual Capital- Market Value versus Book Value

Skandia has suggested that any difference between the book value of a company's assets and its market value must be accounted for by the value of intellectual capital as shown in the following chart.



Intellectual Capital = Market Value - Book Value

There are theoretical and practical problems with this approach, however. Market value is affected by many factors, only some of which represent true intellectual capital. The above relationship may be a fairly good approximation for publicly-traded companies but less so for private companies, where the market value is unknown. It is also not valid when there is excessive "hype" such as for some of the Internet stocks. Nevertheless, it is one approach for which metrics can be applied, since both the book value and market value are known quantities for most publicly traded companies.

1.4 Measuring Intellectual Capital- The ProGrid Approach

Organizations that do not have an established reliable market value may still have substantial value in their stock of intellectual capital. In the ProGrid approach, three surrogates for market value can be defined which serve as predictors for future commercial success, Intellectual Assets, Practices and Processes, and Expected Impact. These factors become the key drivers for a matrix of performance criteria for the various ProGrid tools.

ProGrid was initially developed as a benchmarking tool to assess the practices of research organizations in comparison to those of leading R&D organizations. It was later extended to the assessment of technologies arising from these organizations. In a later

stage of evolution, the ProGrid methodology was used to assess the capability of organizations to commercialize these technologies.

The methodology has now been extended to a wide range of intangible assets, including selecting projects for funding by venture capital organizations. Proposals submitted to venture capitalists are usually submitted by early stage companies where physical assets are largely absent. The evaluation of the future potential of these companies must be based almost entirely on the strength of their intangible assets, such as their technology and management skills.

There are five key steps in applying ProGrid to the measurement of any intangible asset:

Step 1- Define a series of criteria (e.g. the values, priorities and expectations of the measurer) with respect to which the intangible asset is to be measured.

Step 2- Select two of these as independent overarching criteria that if both achieved to a high degree yield the highest possible value for the asset. Construct an evaluation grid that has these two overarching criteria as the axes.

Step 3- Organize the remaining criteria into a matrix, each cell of which represents a factor which if achieved contributes to either or both the overarching criteria.

Step 4- Establish a series of quality or performance levels for each cell of the matrix. In ProGrid terminology, these levels comprise the Language Ladder™ measurement system.

Step 5- Construct a bar graph that compares the ratings of each of the matrix cells.

By following the above steps, and undertaking a prescribed assessment procedure, the value of a specific intangible asset can be determined and compared to other assets.

1.5 Building on the Literature

Those involved in the development of ProGrid have experienced frustration with other evaluation methodologies and saw the need for a more rigorous and disciplined process than those used by many funding/investment organizations. Direct experience with a multi-million dollar resource investment fund left one of the developers with the belief that conventional approaches of collecting the opinions of knowledgeable experts did not provide the consistency needed to achieve optimum fund performance. Continuing involvement of several of the developers in government peer reviews gave rise to concerns with respect to the time spent in undertaking the reviews and the difficulty in getting busy executives in academia and business to participate in a lengthy review process. This issue is discussed further in Chapter 3.

With the incentive to search for an improved process, a number of currently used and historical evaluation processes were reviewed to learn from their practices. These included:

The Risk Management Matrix of the Boston Consulting Group

This was a technique that used four-quadrant grids for displaying performance. The matrix uses Relative Market Share and Growth as the two axes. As noted in the review by Millet and Honton[5], these terms represent cash generation and cash use respectively. Thus, these two axes are not independent variables. Further, Millet and Honton note that the portfolio analyses methods, of which the Boston Consulting Group Risk Management Matrix is an example, are "not only highly judgemental, but also highly arbitrary (even biased)". Such methods are qualitative and the axes are unscaled. The position of a technology in these matrices is not subject to quantitative examination by other evaluators. The ProGrid methodology was developed to overcome these deficiencies by using independent and scaled axes, relevant criteria and well-defined performance levels.

The Kepner-Tregoe Decision Process[6]

This technique lays out key criteria for a selection process and uses a numerical scale to rank alternative choices. This methodology is particularly useful in problem solving by identifying the likely cause of an undesirable event by listing and weighting potential causes. This approach illustrates the importance of having clearly defined criteria and separating them into "musts" (overarching criteria in ProGrid terms) and "wants" (desired goals that cumulatively contribute to the final decision).

The Blake Managerial Grid[7]

The Blake grid is used to optimize the balance between people-focused and production-focused human resource practices. This technique uses a grid that displays and compares different personnel behaviour practices. Although not quantitative, it shows how subjective factors can be organized into meaningful patterns.

The Myers-Briggs Personality Test[8]

This evaluation test ascertains the personality traits of individuals by using carefully defined statements and randomized selections of preferred statements to define personality traits. It is useful in improving group dynamics by valuing different approaches to solving problems. This influenced the effort made in ProGrid to construct a calibrated scale of statements to establish comparative performance levels.

ProGrid methodology, in part, is based on some of the proven and robust principles established by these well-known management techniques.

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[5] A Manager's Guide To Technology Forecasting And Strategic Analysis Methods, Stephen M. Millet and Edward J. Honton, Battelle Press. 1991

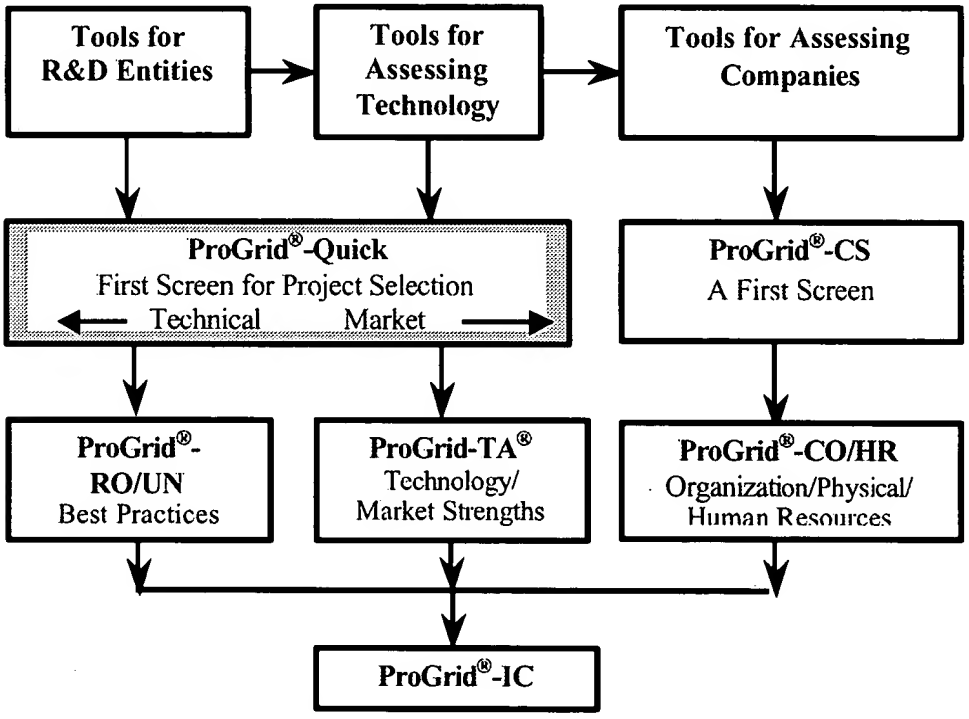
[6] http://www.kepner-tregoe/index.html

[7] The Managerial Grid," Robert R. Blake and Jane Mouton, Gulf Publishing Company, Library of Congress Number 64-14724, 1964

[8] http://www.oise.on.ca/~cengel/coop.mbcareer.htm

1.6 The ProGrid Family

The ProGrid family is a set of robust decision-assist methodologies within which there exists a set of tools which support each other, can be customized to meet the current needs of a very diverse set of users and continuously evolve to meet their future needs. Many of these relate to the commercialization of new concepts, new processes, new products and new services. From left to right in the following chart there is a shift from a technology focus to a more market or organizational focus. Proceeding down the chart there is a shift from screening tools to more definitive and detailed evaluation tools.



Some of these are set piece tools (e.g. ProGrid-RO and ProGrid-TA) that are used for benchmarking and auditing purposes. These have been employed in more than five countries and a sizable database has been accumulated. Other ProGrid tools have been customized for specific purposes, particularly those in the ProGrid-Quick category, and are used primarily as decision-assist tools. ProGrid-IC represents a collection of processes and tools for managing intellectual capital within an organization by establishing the current and desired future positions and tracking performance trajectories. These are customized for the needs of individual organizations.

Descriptions of the members of the ProGrid family are described in the following chapters of this manuscript. As ProGrid evolves, its application outside the science/technology/commercial market fields has become apparent. One such application has been included.

1.7 The ProGrid Evolutionary Path

As development of ProGrid proceeds, it has increasingly been recognized as not just a collection of tools but an integrated system for managing the intellectual power of an organization. This evolution has taken place over the past eight years, with the following key milestones:

1991 to 1993- Development of ProGrid-RO as a tool to address the relationship of an R&D organization to the "clients" it serves, and to the critical issue of balancing short and long term programs, an issue recognized in every survey as critical to effective management of R&D, both public and private.

1993 to 1994- Development of ProGrid-TA as a tool to manage the technology arising from R&D organizations, assessing both the technology advantage and the market potential.

1994- Development of ProGrid-UN in response to a University of Toronto strategic planning initiative to benchmark the university against North American leading institutions.

1995- Development of ProGrid-CO to assess the ability of a company to sustain itself through continual innovation of its structure, practices and product offerings.

1996 to current- Continued evolution of the practical application of the above tools through customization to meet individual client needs and the development of user-friendly effective processes and software.

1997- First major international benchmarking project, involving ProGrid-RO and the evolution of ProGrid-based intellectual capital measurement techniques.

1999- Development of ProGrid-HR for performance and compensation management, the first major application outside the direct technology/commercial arena.

1999- Upward integration of the tools into timely, robust, consistent intelligent systems for the performance management of an entire organization.

2000 onwards- Exploring the rest of the "iceberg".

Chapter 2: Customizing ProGrid (ProGrid Quick)

2.1 Introduction

ProGrid-Quick is a term applied to a wide variety of focused tools used to assist in making rapid highly effective decisions with strong stakeholder consensus. Examples of use include:

- Selection of science funding applications
- Venture capital screening and selection
- Project monitoring and control

Funding/investing organizations that use the ProGrid methodology embed their values, priorities and expectations into an application form. These values, priorities and expectations are first assembled in the form of a matrix of performance factors and a set of calibrated performance levels (the Language Ladder™) established for each factor. The application form includes a self-assessment section in which the Applicant selects performance levels that represent the current status of the undertaking for which investment is being sought. As a key part of this process, the Applicant provides justification for the selections. The completed applications are normally submitted to a review group of up to eight Reviewers. The Reviewers will select their own ratings for the undertaking, based on the justifications provided by the Applicant and their own knowledge and experience.

The Applicant's and the Reviewers' assessments are input into the appropriate ProGrid software for analysis. The software will provide an automatic output report, in both chart and text form, containing the following information:

- The grid position of the application with respect to the two overarching criteria established by the funding organization
- The strengths and weaknesses of the application with respect to the matrix cells established as the assessment framework (the profile bar chart)
- A comparison of the responses among Reviewers
- A sensitivity analysis of the assessment, identifying correctable weaknesses and potential fatal flaws
- Specific comments of the Reviewers with respect to individual criteria or the application in total
- A comparison of the ratings of the current application with those previously considered in the user's database
- A customized report to provide constructive feed-back to the Applicant

The software also has provision for:

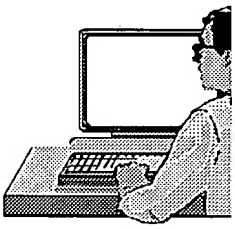
- Maintaining separate records for different themes within a funding program
- Tracking stages in the course of development of a project.

The management team responsible for making funding/investment decisions uses the output charts and text as an assist in making these decisions. The above process is illustrated in the following pictorial representation.

Customizing a ProGrid Evaluation System

Definition of values, priorities and expectations

Values, priorities and expectations expressed in "Language Ladder" format



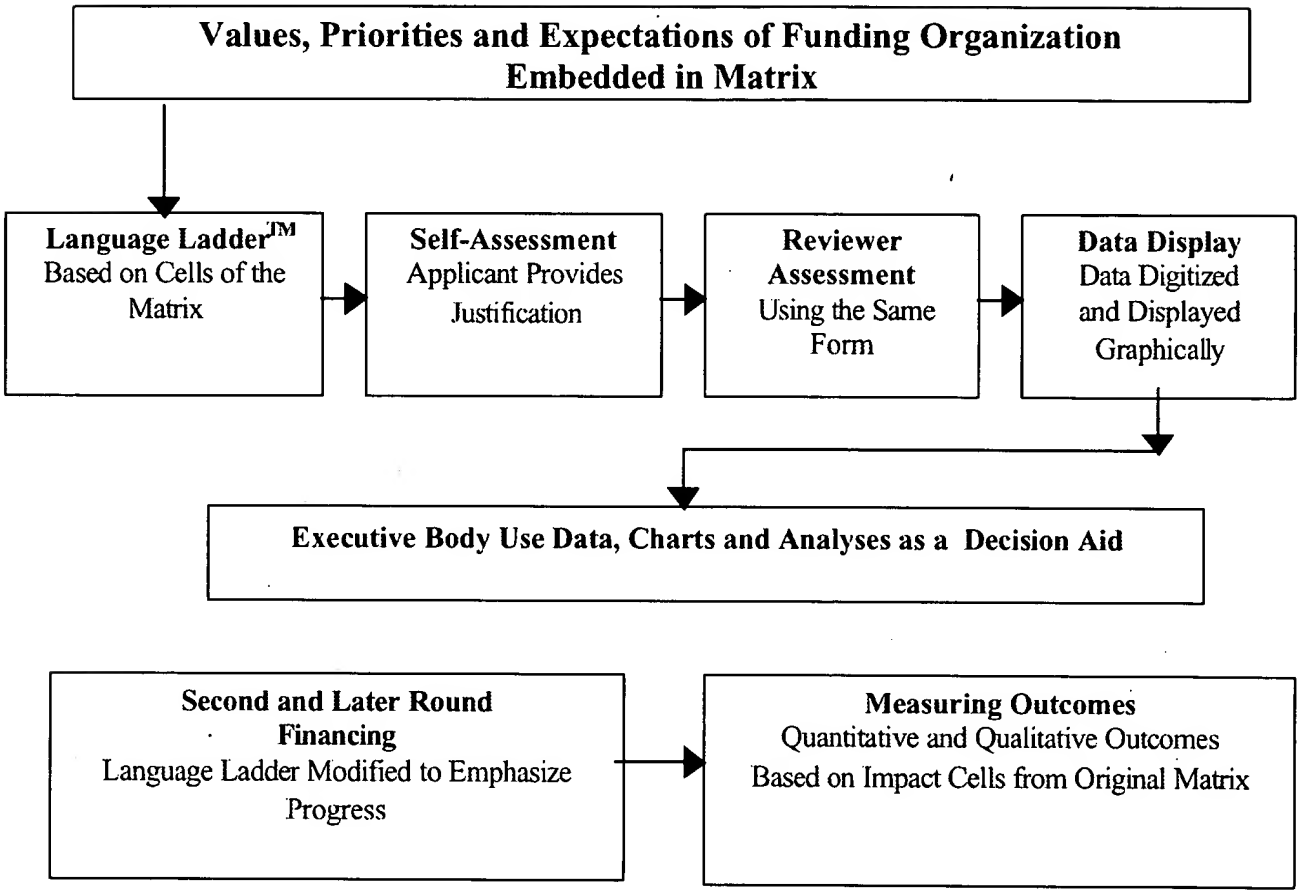
Applicants carry out self-assessment

"Busy" reviewers validate assessment

Management team uses ProGrid charts for real time decision-making

2.2 The Decision Process

A more rigorous description of the decision process is illustrated in the following flow chart.



2.3 The Evaluation Matrix

Every customized ProGrid-Quick tool has a distinctive evaluation matrix, reflecting the values, priorities and expectations of the funding/investment organization. However, the same general factors appear in most matrices, and therefore there is a recognizable pattern among many of the matrix cells. Thus, it is possible to construct a list of cells that have similar characteristics, as shown in the following generic matrix.

There is a specific structure that has been found to be effective in developing the matrix. Columns A and C should group criteria that mainly influence one of the overarching criteria. Column B should contain criteria that influence both of the overarching criteria.

The 20 cells shown are typical of those that have been used to date. Normally only seven to twelve are employed in a specific customized tool. For the assessment of proposals where scientific merit and the qualifications of the principal investigators are the major selection criteria, the cells will mainly be those shown the first two columns, which, in turn, would be developed in a three column format (e.g. the impact for some users will be the connector for others). For the assessment of proposals where market impact is the ultimate goal, the cells in the right-hand column would have increased importance.

Candidate Cells for Evaluation Matrices

Column A *The Concept*	*Column B* *The Connectors*	*Column C* *The Market/Impacts*
The Advance	*HQP/Skills*	*Technology Transfer*
The Team	*Collaboration*	*Market Impact*
Facilities	*Industry Involvement*	*Competition*
Capacity	*Intellectual Property*	*Rate of Return*
Project Management	*Commercial Readiness*	*Strategic Fit*
Business Plan	*Receptor Capacity*	*Societal Impact*
Validation	*Financing*	

2.4 Language Ladder Statements

There are many versions of Language Ladder statement sets that apply for any of the cells in the above-described matrices. The specific language used reflects the values, priorities and expectations of the funding/investment organization. A compendium of the statement sets that have been used to date has been accumulated and help guide the development of new customized tools.

The following is a typical Language Ladder statement set for the criteria on "Validation" of a new concept:

A. The concept has had a limited level of testing.
B. Key elements of the concept have been confirmed but an integrated system, model or prototype has not yet been developed.
C. An integrated system, model or prototype has been developed and has been tested.
D. An integrated system, model, or prototype has been developed and the product/process/service successfully tested under a full range of commercially relevant conditions.

These statements should be constructed to be clearly distinguishable and as uniformly separated as possible. The progress from "limited testing" to an "integrated prototype tested under commercial conditions" takes place over four well-defined steps, that should be justifiable by the Applicant and readily verified by Reviewers.

2.5 Application Form and Process

The application consists of two parts:

- Applicant information and a synopsis of the research/product/process/service.
- A self-assessment by the Applicant with respect to specific performance factors.

The application form is developed by the funding/investing organization and reflects the organization's values, priorities and expectations. The self-assessment portion of the application form consists of up to twelve performance factors.

Organizations that use the ProGrid evaluation methodology will normally establish a committee or panel to review each application and make either the final decision or a recommendation to be considered by a higher-level body. In some cases, the committee will consist of the group who undertook the original reviews. In other cases, the committee may be composed entirely of individuals who have not been involved in the review process. It is desirable that the committee receives the ProGrid output reports in advance of the committee meeting. In many cases, there will be considerably more requests for funding than funds available. In other cases, funds may not be a limiting factor. This should be established early in the meeting and a protocol developed dependent on this factor.

Some competitions have only a small number of applications and the Committees involved may decide to review each application in either the order submitted or some other arbitrary order. The Chairperson will normally develop a protocol compatible with the number and nature of applications.

If funds are limiting, an effective technique is to use either or both the positioning grid, or an R-value rating table (the R-value is the measure of the distance to travel to the upper right hand corner of the positioning grid), to divide the applications into three groups:

Group 1- Highly Rated Applications
Group 2- Applications that border on the budgetary cut-point
Group 3- Applications that are significantly below the budgetary cut point

There is no single method for making the final decisions/recommendations, but the following is one approach where the number of applications is large and where funds are limiting.

Group 1 applications are considered in order of the R-value ranking, determining if there are any significant differences among the Reviewers in any performance factor. If not, budgetary or other concerns of any Committee member should be raised and considered. After this process, a consensus should be sought about funding.

Group 2 applications may require more effort. As for Group 1, differences among Reviewers should be identified and discussed. In addition, the sensitivity (potential for future changes) in the project should be assessed. The likelihood that current weaknesses can be readily corrected should be addressed. Any fatal flaws should be identified. (The

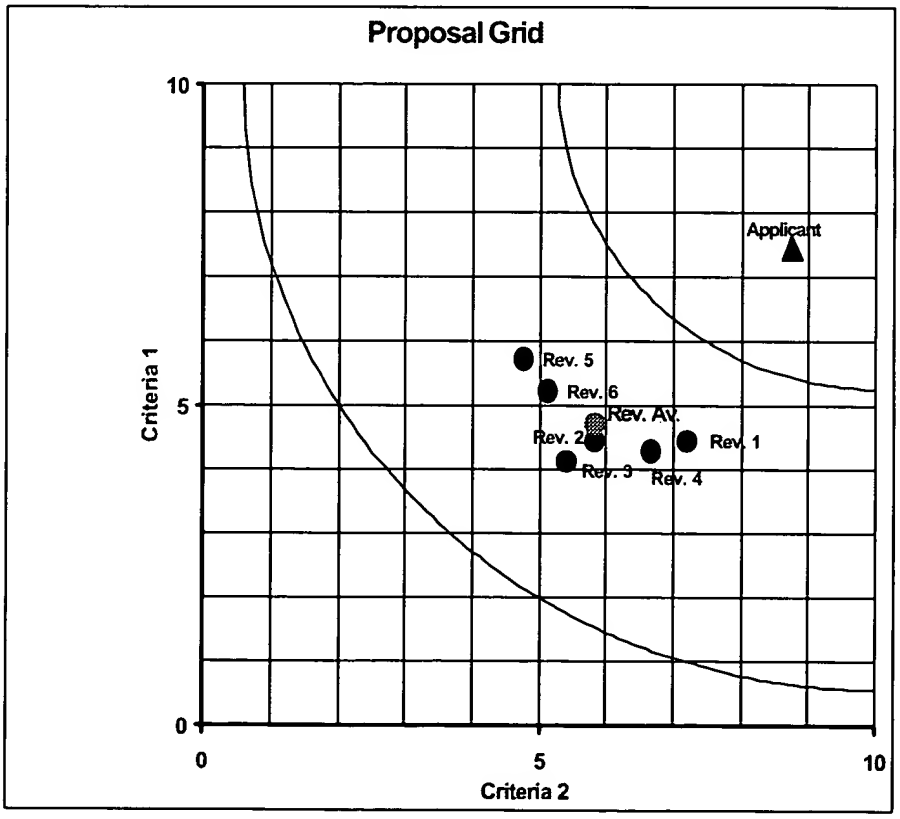
sensitivity analysis described in the following section is useful for this purpose). After this discussion, it should be feasible to either confirm the current relative position of the application or to shift it upwards or downward in the seriatim.

Group 3 applications can be considered in an open discussion, in which a Reviewer may challenge the weak position and present views contrary to the average Reviewer assessment. Examples that fall in this category would be Applications that have singular strengths that would warrant funding on a "prospective" basis.

If funds are not limiting, the grid position, or R-value, of each application can still be used to obtain the relative strength of each application. It is helpful if there is a database of past applications to serve as a comparison framework. Over time, a ProGrid user will develop norms of the characteristics of applications that are effective predictors of future success.

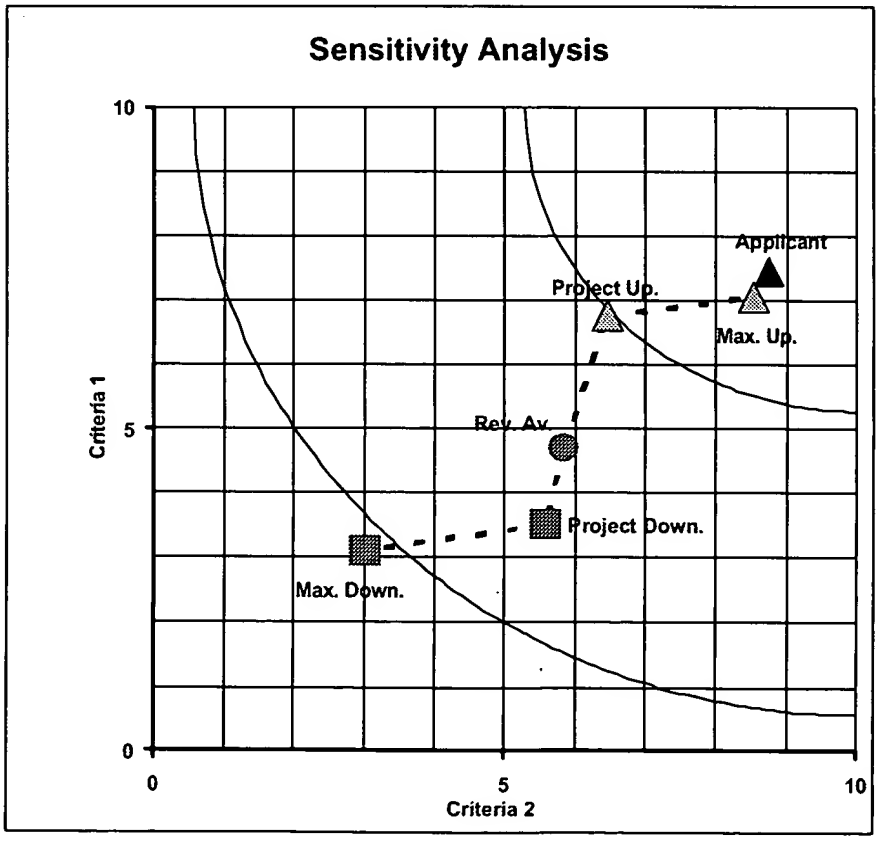
2.6 The Charts

The Committee will have available a series of standard ProGrid charts to assist in their review of the submitted applications. The following chart provides the current position on a grid with the overarching performance criteria that were selected by the funding organization as the two axes. This chart displays the spread among the assessments carried out by the Reviewers and the position as determined by the Applicant.

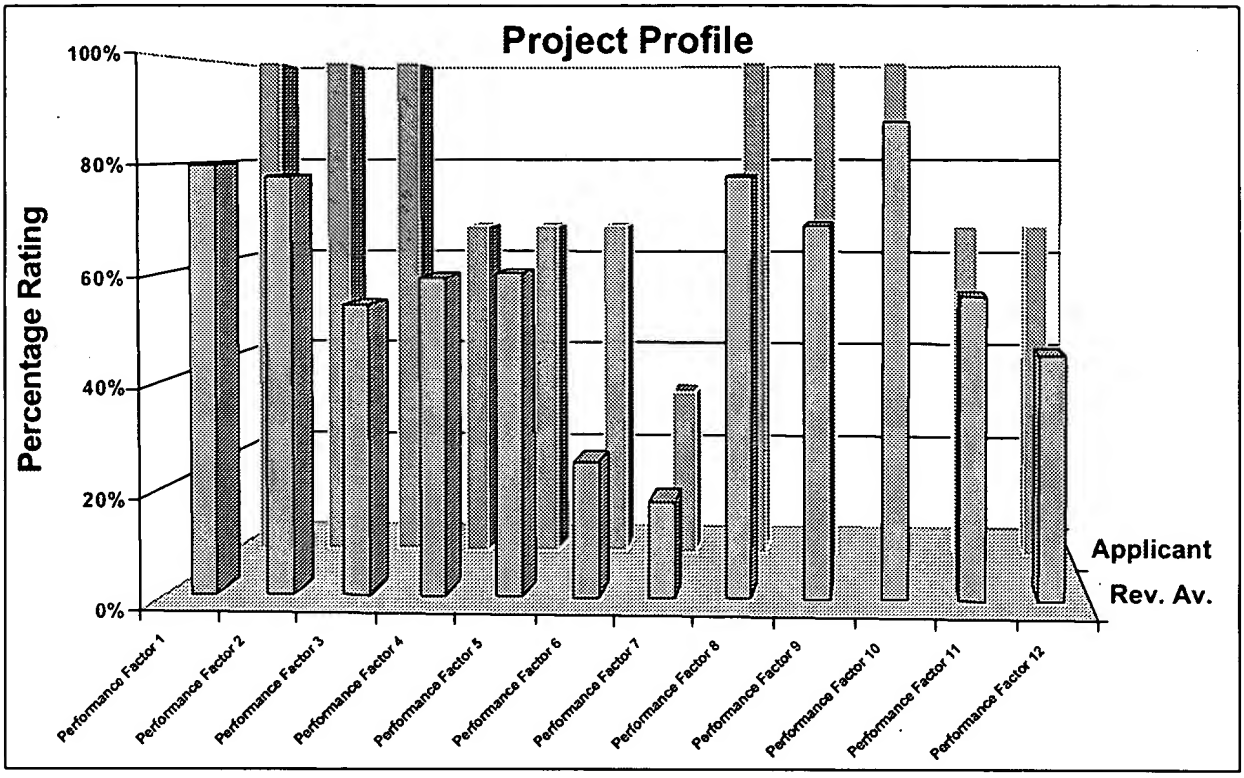


The Reviewers have selected the performance factors that best define the current position of the Application. In some cases, there is an expectation that the position will improve as development proceeds. Some of the improvements are largely within the control of the Applicant and would be key factors to address in the continuing development program. Other factors are largely outside the control of the Applicant and reflect external conditions. Similarly, there is the potential for a slippage in the current position if some of the controllable development expectations are not successful or if some of the external factors adversely affect future prospects.

The ProGrid assessment methodology includes an optional expert system that predicts possible upsides and downsides based on the current position of the Application and experience with similar applications. The potential upsides of this project are categorized as "Project Upside" and "External Upside". For plotting purposes, the chart positions for the upsides are shown in the following chart as "Project Up" and "Max Up", with the latter reflecting the attainment of all the upsides. Similarly, the potential downsides are identified as "Project Down" and "Max Down".



The following bar chart shows a profile of strengths and weaknesses of the application with respect to the performance factors in the original ProGrid matrix.



The level of consensus among the Reviewers, and comparisons with the Applicant's self-assessment for each performance factor, is provided in either bar chart or tabular form.

Bar Chart:

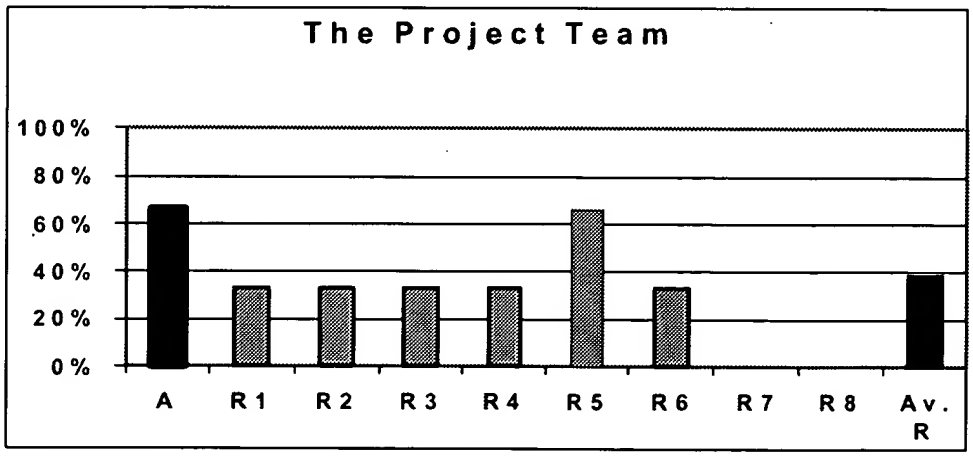
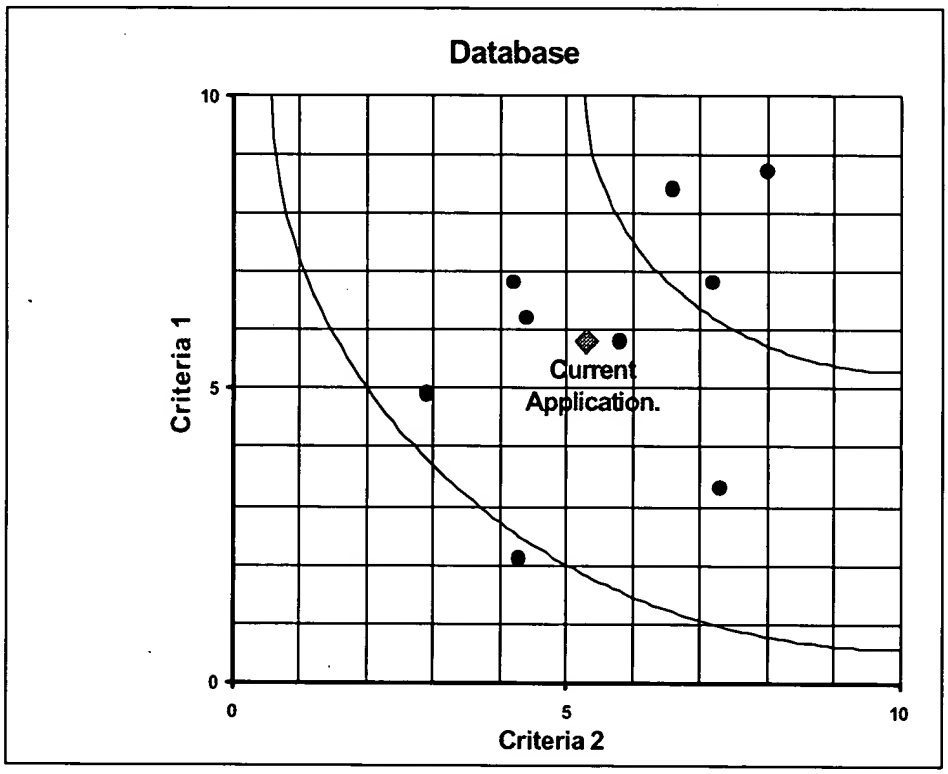


Table Format:

	Appl.	Rev. 1	Rev. 2	Rev. 3	Rev. 4	Rev. 5	Rev. 6	Rev. 7	Rev. 8
Rating "The Project Team"	C	B	B	B	B	C	B	-	-

Over time, users will accumulate a database of previous applications and will learn through experience the characteristics of a successful project. This chart provides a comparison between the grid position of the current application with the grid position of all previously considered applications.



The software provides considerable flexibility in analysing the data in the database. Since this tends to be user specific, it is best to do this in a separate post-competition analysis. A table is provided in the ProGrid procedure with each Application on a separate line. This table can be sorted by R value (the distance from a data point to the upper corner of the grid, with (10, 10) expressed as 100% and (0, 0) expressed as 0%, with a running total of the cumulative dollars to that point in the table.

Provision has also been included to permit the sorting by one performance factor only, or by a sub-set of performance factors.

If the Applications are divided into several phases, stages or themes, the average result for each group, and other statistical parameters, can be calculated and graphically displayed. If these analyses become routine, they can be built into the software as automatic processing procedures.

2.7 Peer Review and ProGrid

Organizations who provide funds for scientific projects in a formal competition typically use a Peer Review process to select winning projects. This is a time-honoured process that has served the scientific community well in the past and will continue to be a mainstay of project selection. Applications normally will consist of detailed descriptions of the research planned in rigorous detail. Copies of papers describing previous related research will frequently be included along with full curriculum vitae of the principal investigators. The documentation would be equivalent to a complete business plan for a commercial venture. Those involved in the review process are normally other researchers with experience in the area involved. For most of the reviewers, participating in such reviews is part of the normally accepted workload, and it is feasible for each of them to commit several days to a formalized review and selection process.

Peer review as described above has limitations in certain situations. When the volume of applications is large (several hundred or more), when there is a near-term business implication requiring a wider spectrum of experience of the reviewers, when there is a need for a high level of transparency in the review process and when a more consistent basis of providing feedback to applicants is required (successful and unsuccessful), the standard peer review process requires modification.

ProGrid is a form of peer review in that selected reviewers assess a submitted application form. However, the high focus of the applications on well-defined criteria selected by the funding body, the self-assessment by the Applicants, and the ease of validation by reviewers leads to a review process that meets the requirements of competitions where conventional peer review has been found to be less suitable.

Organizations that have used ProGrid have reported the following advantages:

- Comprehensive- ensures that all key aspects have been addressed (open architecture)
- Achieves consensus- provides input from all stakeholders
- Rapid- busy experts are willing to participate in review process
- Disciplined and reproducible
- Graphical and easily understood
- Ranks a large number of assets in a portfolio
- Provides a corporate data base and memory
- A self-learning methodology, constantly improving
- Focuses on issues key to making difficult decisions

Chapter 3: Principles of ProGrid

3.1 The Importance of Establishing Assessment Criteria

Great emphasis has been placed in this manuscript on the need for a clear definition of the criteria and values underlying the assessment process. When assessing tangible assets, the criteria are intrinsic to the asset and the value tends to steadily decay over time. For intangible assets, the criteria are more subjective and the value may grow in time. It is necessary to dig deeply into the vision, mission, goals and objectives of the organization for which the assessment is being carried out to determine the basis for the assessment.

Thus there is a shift in emphasis from the intrinsic value of the asset to the values of the person/organization interested in the asset. Value is in the "eyes of the beholder".

How many criteria are required to represent the value equation? For the customized ProGrid tools discussed in the previous chapter for making funding/investment decisions, seven to twelve criteria have generally been found to be sufficient. For the set piece ProGrid tools discussed in the following chapters, from 30 to 60 criteria have been found to be required to properly represent the assessment target.

3.2 The Structure of the Evaluation Matrix

For the set-piece tools, the individual criteria should be grouped to form the cells of a matrix. This is done both to reduce the complexity of the evaluation to a smaller number of key factors, but also to group criteria that have a common relationship. For the customized shorter tools, the individual criteria can be arranged in matrix form.

How many cells are appropriate in the matrix? Trial and error has led to the conclusion that six to twelve cells can do the job, with nine being a frequent occurrence. The three by three nine-cell matrix is a convenient format that allows three factors to be considered in each column of the matrix. The three-column format enables the separation of the matrix into the first and third columns representing the two overarching criteria and the middle column representing the connecting factors that link the overarching criteria. Funding organizations whose responsibilities end once the selection decision is made tend to use a fewer number of cells; venture capital companies normally use a higher number of cells to assist in tracking future progress.

Several users have addressed the issue of whether a single matrix can be used either to span a broad area of interest (from more scientifically focused applications to more commercially directed proposals) or to span a period of time over which projects have matured. In some cases, it has been decided to use more that one matrix to span the focus/time spectrum involved. Although this has some advantages, it reduces the ability

to track projects as they mature. If the overriding mission of the funding/investment organization is to meet more advanced criteria in the future, it is preferable that these criteria be included in the initial matrix, even though applications would not be expected initially to rate high in those criteria.

3.3 The Need for Two Overarching Criteria

The question is frequently asked why a two-dimensional grid is used in ProGrid rather than a three or larger dimensional space. Many users have started the design process with three key overarching criteria. To date, experience has shown that one of the three criteria can be resolved into the other two, in effect becoming the middle column of the matrix. Is there something fundamental about two dimensions? In many activities of life we are constantly bombarded with decisions that require a fast assessment of two choices. In many cases they represent short and long-term options, immediate gratification of needs or longer-term investment to meet future needs.

Companies that fail due to the obsolescence of a dominant product have failed to provide for product replacement. They had been one-dimensional in their thinking. For individual staff members, keeping the inbox clean is an important short-term requirement in business life, but unless some long-term contributions are made to the organization, survival is unlikely. Thus, one of the axes in most of the ProGrid tools has a time dimension, in effect separating the current situation from an expected desired future.

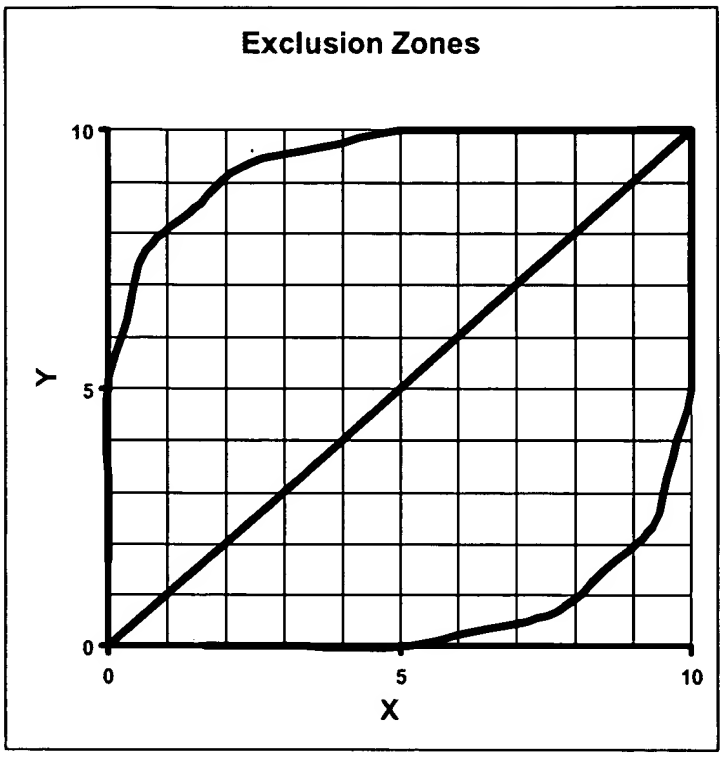
The tendency in life is generally to think in a one-dimensional mode. Extending this to two dimensions in which the second dimension provides a trajectory to the future is a major and worthy task.

3.4 Independent Axes/Exclusion Zones

It is essential that the grid axes be relatively independent. This means that the overarching criteria that are plotted on these axes can be achieved independently of each other. Examination of the ProGrid matrices shown in this manuscript would intuitively suggest that this is true since Columns A and C in general contribute to one axis only. The degree of "independency" dictates how much of the grid is accessible for plotting purposes. The percentage of the chart that is accessible depends on both the rating and weighting factors used in the ProGrid software.

The following chart illustrates a typical case where there are two exclusion zones that are not accessible. The weighting and rating factors used in the methodology define these zones. It is important that these zones are not excessively large. If they are, it means that there are too many criteria that influence both axes. If carried to the limit, only the diagonal is accessible and in this case, the axes are no longer independent. The example shown represents a realistic case in which the two exclusion zones in the upper left corner and the lower right corner are reasonably small. Once a sizable database has been established, a multi-variate statistical analysis (e.g. Principal Components Analysis) can

be carried out to identify two independent axis variables that have maximum variance with respect to the data set.



3.5 Importance of Self-Assessment

Most of the active ProGrid tools include self-assessment as a fundamental part of the process. In benchmarking, this is particularly important in that the purpose of benchmarking is to improve the performance of an organization. It is critical that the organization be actively involved in the process, since it will have the prime responsibility for acting on the results.

Self-assessment is also normally used in the shorter ProGrid-Quick tools used as decision assists. It is the justification that the Applicant uses for the self-assessment that enables reviewers to rapidly validate the assessment. The clarity in which the Applicant is able to make his/her case is an important input into the reviewers' recommendations.

Nevertheless, self-assessment is not a prerequisite for using ProGrid methodology. In certain situations, it may prove to be appropriate to exclude self-assessment, or at least not to disclose the self-assessment to reviewers. In such cases, it will be important to ensure there is sufficient information provided in the application form for the reviewers to make their independent judgements. Care should be taken not to fall back on the

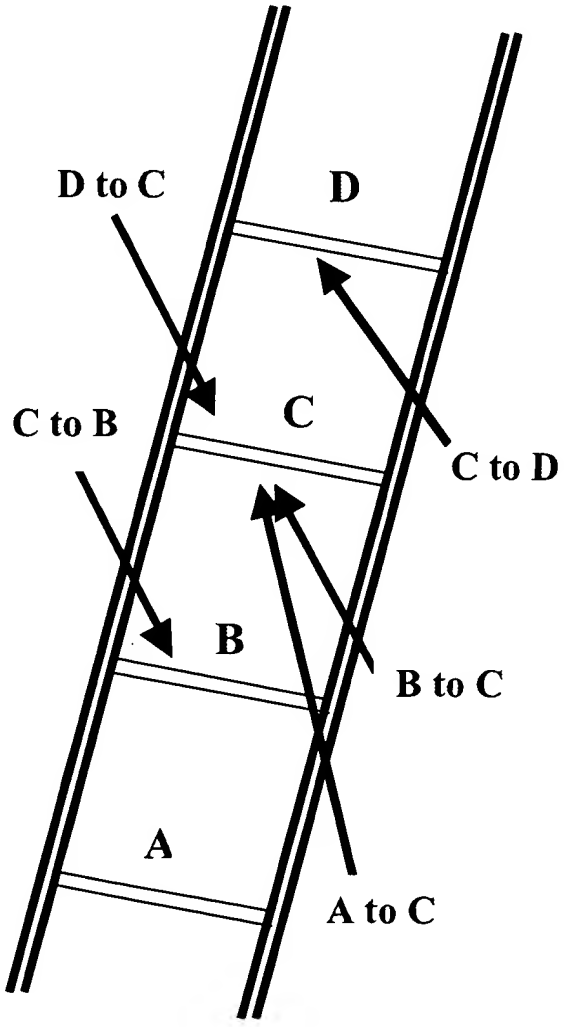
traditional approaches of providing masses of information that reviewers have to dig into to extract the key factors on which to base their decisions.

3.6 Sensitivity Analyses

Although the prime objective of ProGrid evaluations is to assess the current position of an intangible on the assessment grid, it has been useful to build in a future forecast in several of the tools. The concept behind the forecast is the identification of the likely or preferred future state, and then a determination of what events must occur to bring the forecast to fruition.

This approach can be visualized by examining the "space" between the steps in the four-step ProGrid Language Ladder, as shown below:

•Focus on the space between the steps of the ladder
•Using the current position as a base, identify the tasks required to achieve a desired future state



The emphasis thus shifts from a static assessment of current position to the more dynamic analysis of what is needed to either move up the Language Ladder and/or what events need to be watched to avoid "falling off the ladder".

As an example, consider the following Language Ladder statement set.

With respect to the products/processes/services provided by this concept:

A. there is no evidence at this time of customer acceptance.
B. preliminary market studies indicate positive customer acceptance.
C. specific customers have been identified who have indicated their intention to place orders.
D. current or new customers have given firm orders today.

A funding/investment organization could decide that the A level represents a fatal flaw. If there is no evidence of customer acceptance at this time, the concept is too ill defined or early stage to warrant support.

However, there is nothing implicit in statements B and C that would preempt reaching a higher level in the ladder. It is relatively easy to define an action phrase to describe what needs to occur to achieve a higher level.

The B to C shift phrase would require that market studies be extended and specific customers be identified who have indicated their intent to place orders. A shift to the D level would add the concept of submission of firm orders.

On the downside, a D to C shift could occur if the customers who have placed orders decide to withdraw them, for whatever reason.

Thus, it is feasible to develop an expert system that will "hard-wire" a number of likely future events and predict both a future outcome and the events needed to attain this outcome. The expert system can be designed to identify key actions and milestones to be used in the execution of the project and for tracking progress from conception to completion.

3.7 Why Four Steps in the Language Ladder?

The selection of four steps in the Language Ladder came about as a result of considerable trial and error. One powerful assessment methodology that has been applied to the safety of laboratories uses a two-step ladder- a laboratory is either safe or not safe with respect to a large number of criteria. This binary approach works well for a situation where success can be precisely defined. However, for intangibles in general, success is often time dependent and involves some form of evolutionary path.

The first ProGrid tools used a ten-step ladder with only the top rung being defined. Progress toward the top rung was expressed numerically in numbers ranging from 1 to 10. Evaluators found it necessary to mentally construct their own plateaus of value and

suggested that it would be more effective if some of the intermediate levels were defined and agreed to among a group of evaluators.

The next attempt was the development of a three-step ladder that provided two steps below the top rung. There was a tendency for reviewers to migrate to the middle rung and the level of differentiation among intangibles was frequently small. Extending the Language Ladder to four steps forces the evaluators to select above and below average values.

Although there has been some discussion about adding further rungs to the ladder, most users have found that the four-step ladder provides a sufficient level of differentiation.

3.8 ProGrid Software

No overview of ProGrid would be complete without a discussion of the software used to produce the charts and graphs shown in this manuscript.

ProGrid is neutral with respect to the calculation and graphing programs. However, the ready access of most users to Excel spreadsheets and graphics and to the ACCESS database program has meant that these have been used to generate the majority of currently used ProGrid systems.

Initially, the calculations and graphics were produced by Excel alone, and reports produced manually using a word processor. This combination worked well for the initial set-piece tools and for the customized ProGrid-Quicks up to about fifty applications per competition.

The subsequent evolution of software development has taken the following paths:

Set-Piece Tools

ProGrid-TA (discussed in Chapter 4) was the first tool to experience logjams in processing. Over 200 technology/markets were assessed before it was realized the time spent in producing a comprehensive report of the findings was going to restrict commercial use. Skilled report writers would take at least a day to analyze the interactions among the 37 statements sets and to produce a realistic report of the current position of the technology/market pair and its future prospects.

An expert system in Excel was developed by experienced technology managers that replicated the evaluation protocol that previously had been done manually. The software generated the report immediately on conclusion of the ProGrid-TA assessment session. Some users of ProGrid-TA have since further customized the report to meet specific needs.

The final step in the evolution of ProGrid-TA software was to insert an ACCESS database front-end that provided for data entry and data storage. The end result has been

a three-component software system, an ACCESS front-end for data entry, an EXCEL calculation module for carrying out the ProGrid calculations, and a linked Excel report module that produces the output report.

Customized Tools

Some users of customized tools receive a very large number of applications in a competition, measured in the hundreds. The time spent in opening, naming, inserting data into, and saving the necessary files was onerous and became a serious deterrent to using the ProGrid system. This was overcome by adding an ACCESS database management system to the front-end of the Excel calculation program. The ACCESS database provided for data entry and file management, automatically opening, naming and saving individual files. In a similar fashion to the ProGrid-TA report described above, an Excel output report was customized to fit individual user needs.

As with ProGrid-TA, the end result has been a three component software system, an ACCESS front end for data entry, an EXCEL calculation module for carrying out the ProGrid calculations and a linked Excel report module that produces the output report.

As the evolution continues, more of the "expert" part of the system is being transferred from Excel to ACCESS to permit more rapid customization of the tools. Customization of the output report has been a major part of ongoing upgrades.

Chapter 4: Technology Assessment (ProGrid-TA®[9])

4.1 Introduction

ProGrid-TA® is a powerful tool for assessing the technical and commercial readiness of technologies, for making decisions at critical gates in a technology's evolution, for following the course of a technology over time, and for prioritizing a portfolio of technologies. The methodology recognizes that future success depends on two relatively independent targets, technical strength and market strength.

Development of the ProGrid-TA tool involved the standard five ProGrid steps:

Step 1- Define a series of evaluation criteria with respect to which the technology is to be measured.

Step 2- Select two of these as independent overarching criteria that if both achieved to a high degree yield the highest possible value for the technology. Construct an evaluation grid that has the two overarching criteria as the axes.

Step 3- Organize the remaining criteria into a matrix, each cell of which contains related criteria.

Step 4- Establish a series of quality or performance levels for each cell of the matrix. In ProGrid terminology, these levels comprise the Language Ladder™ measurement system.

Step 5- Construct a bar graph that compares the ratings for each of the matrix cells.

4.2 Evaluation Criteria

Discussions with various technology developers with experience in commercializing new concepts generated a large number of key criteria that are indicative of technical and commercial success.

Over time, the list has been modified to the following 37 criteria:

Scientific Basis	*Advance on Prior Art*
Uniqueness	*Pervasiveness*
Proof of Concept	*System Integration*
External Validation	*Technical Credentials of Project Team*
Understanding Market Needs	*Supporting Technical Networks*

[9] ProGrid-TA® Trademark registered US # 1,942,770 Canada # 487,128

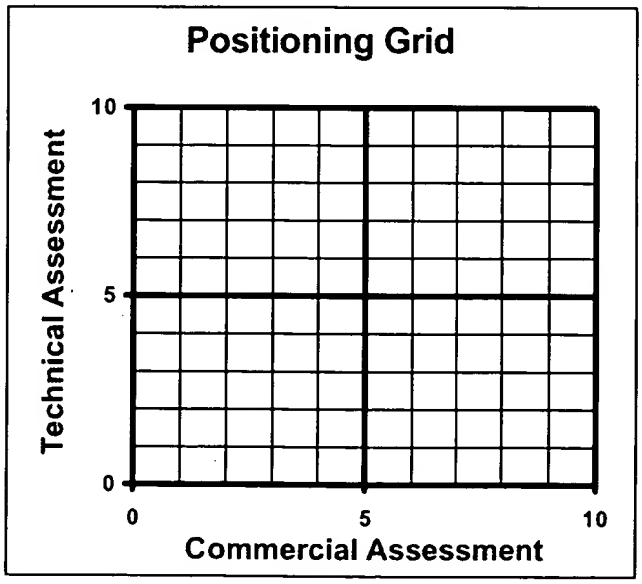
Current Stage of Development	*Level of Development Required to Confirm Commercial Readiness*
Complexity of Scale-up	*Patent Position (or Copyright Position)*
Competitive Intellectual Property (IP)	*Trademark Strengths*
Know-how Requirements	*Scope for Improvements*
Obsolescence	*Duplication*
Avoidance	*Dependence on Other Products/Processes/Services*
Robustness	*Market Acceptance*
Market Impact	*Geographical Reach*
Competitors' Strength	*Regulatory Compliance*
Regulatory Leadership	*Price/Margins*
Competitor's Price Sensitivity	*Cost Reduction Opportunities*
Speed of Commercialization	*Partners*
Market Trials	*Marketing Networks*
Investment Availability	

4.3 Overarching Criteria

Most of the above criteria will influence either or both the technical or commercial value of the technology under consideration. This led to the selection of the following two overarching criteria:

Technology Assessment
Commercial Assessment

as the axes of the evaluation grid as shown in the following chart.



4.4 The Evaluation Matrix

The previously listed criteria can be grouped into clusters of related factors in the form of the following matrix.

A *Scientific Strength*	*B* *Technological Strength*	*C* *Commercial Strength*
Technical Framework	*Commercial Readiness*	*Market Characteristics*
Level of Verification	*Proprietary Strength*	*Margin and Profit Potential*
Excellence of Project Team	*Technological Durability*	*Commercialization Channels*

The columns in this matrix represent a progression from factors that largely influence the scientific strength of the technology in Column A, to those that largely influence its commercial strength in Column C and those that are necessary factors to link the technology to the market place in Column B, serving as the connecting factors.

4.5 The Language Ladder

This is the critical step that establishes the metrics of the ProGrid process. Through experience, it has been found that a set of four steps in the Language Ladder works well. The choice of an even number is important in that it reduces the tendency for evaluators who use the ProGrid methodology to migrate to the middle "neutral" position.

The following are two examples of Language Ladder statement sets that are used in the current ProGrid-TA procedure.

Advance on Prior Art

The concept represents:

A. a relatively small advance on the prior art that would not be apparent to most users.
B. a definable and measurable extension of the prior art that will be discerned by discriminating users.
C. a significant and readily recognizable improvement over the prior art, but the basic scientific and technical principles are similar.
D. a major advance on the prior art and embodies significantly different principles.

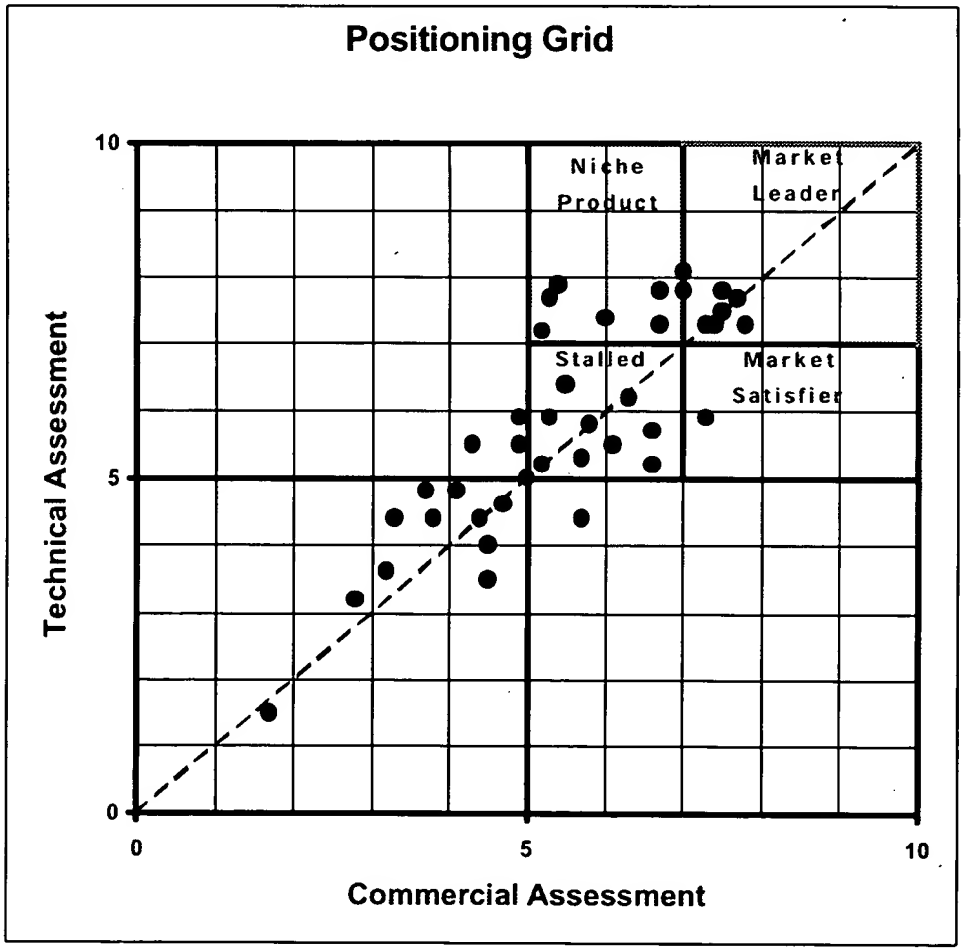
Market Acceptance

With respect to the products/processes/services provided by this concept:

A. there is no evidence at this time of customer acceptance.
B. preliminary market studies indicate positive customer acceptance.
C. specific customers have been identified who have indicated their intention to place orders.
D. current or new customers have given firm orders today.

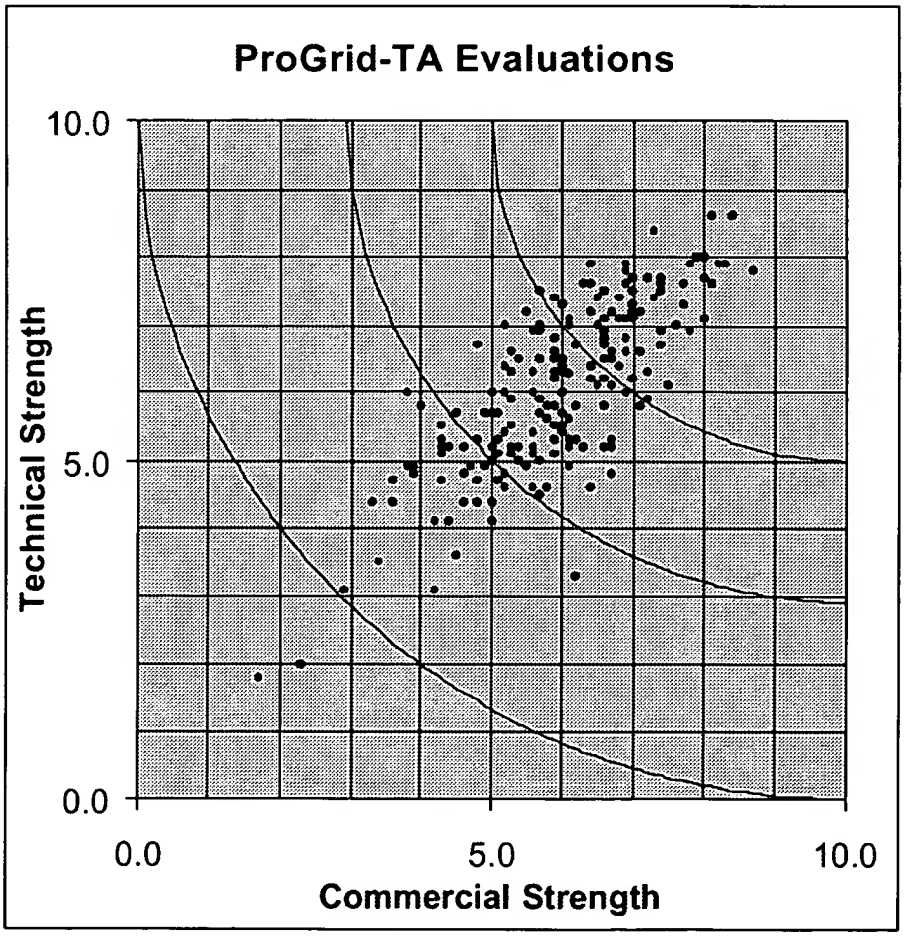
4.6 The Evaluation Grid

Once a technical asset has been evaluated using the ProGrid methodology, its position can be represented on the following grid, depending on its state of scientific and commercial readiness. The data in this chart represent technology/market pairs that were evaluated to the end of 1994.



At the inception of a new idea, its location on this grid will likely be close to the origin. As the idea matures into a bona fide technology, it will follow a specific trajectory. If the technical and market developments proceed in parallel, the trajectory will follow a 45 degree diagonal. If the market develops faster than the technology, or if the technical content is relatively low, the trajectory will lie closer to the x-axis. Conversely, if technical progress proceeds faster than market development, or if the technical content is very high, the trajectory will lie closer to the y-axis. Where the trajectory ends will determine the overall merits of the technology. The division of the upper right hand quadrant into four zones illustrates the characteristics of technologies that fall within those zones. The nature of technologies that lie in the stalled zone will be discussed later; the characteristics of the other zones are self-explanatory.

The four-quadrant grid is useful for obtaining an overall view of the status of a technology. An alternative display of the status is shown in the following chart, in which the four-quadrant boundaries are replaced by three curves that are concentric with the point 10,10. Points that lie on one of these curves have different combinations of technical and commercial strength but have the same distance to "travel" to reach the upper right hand corner of the grid. With this display, zones between the curves can be described as "Embryonic", "Emerging", "Developing" and "Commercially Ready".



A factor "R" can be defined as the distance from a data point to the upper corner of the grid, with (10, 10) expressed as 100% and (0, 0) expressed as 0%.

The R factor can be used to rank a set of technologies, or any other intangible asset, as shown in the table below. Ten technologies that have different X, Y values and therefore different R-values are compared and sorted.

Tech. #	X	Y	R
7	7.4	7.6	75.0%
10	6.9	7.9	73.5%
8	6.4	7.6	69.4%
3	7.2	5.9	64.9%
9	5.2	7.0	60.0%
1	6.7	5.3	59.4%
6	6.7	5.2	58.8%
4	6.0	5.5	57.4%
2	4.8	4.4	46.0%
5	2.9	3.1	30.0%

4.7 The Technology Profile

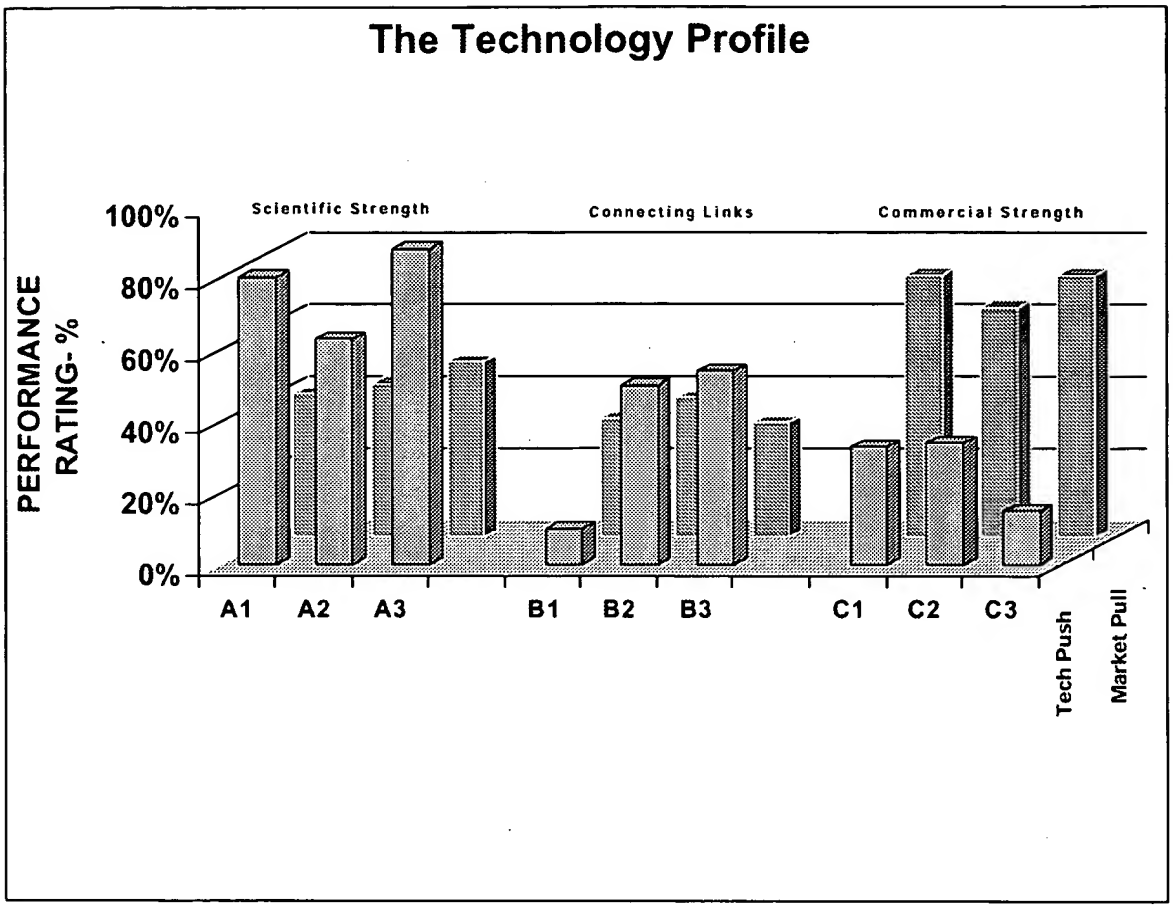
A second and important output of the ProGrid methodology is the Technology Profile bar chart with the bars representing the strength of each cell of the matrix previously described.

The following chart shows profiles for two technologies, one having strength on the left side of the chart (scientific strength) and the other having strength on the right side (market strength).

Over 200 technology/market pairs have now been assessed using ProGrid-TA, and specific profiles have been identified and classified by descriptive names, such as:

- Technology Push
- Market-Pull
- Stalled
- Commercially Ready

Many cases of a stalled technology have been encountered which have modest strength across the profile (in the 45 to 60% range), but no commanding strengths and no major weaknesses, i.e. a flat profile. This is typical of a mature technology that has been involved in several commercial launch attempts where the obvious weaknesses have been corrected but no outstanding strengths have emerged. This is a dangerous combination.



4.8 Advanced Features

Once a current position for a technical asset is defined, it is possible to develop an expert system to predict the future position.

Possible future rating values are determined by the following relationship:

Future value = Current value (A, B, or C) + increment (*x, y or z*)

Where *x* is the number of improvement steps which the asset is likely to achieve if its current position is at level A, *y* is the number of improvement steps that the asset is likely to achieve if its current position is at level B, and *z* is the number of improvement steps the asset is likely to achieve if its current position is at level C. The values *x, y z* are determined by those with experience in the development and commercialization of technology. Once determined, the *x, y, z* values are kept constant until experience shows a change is appropriate.

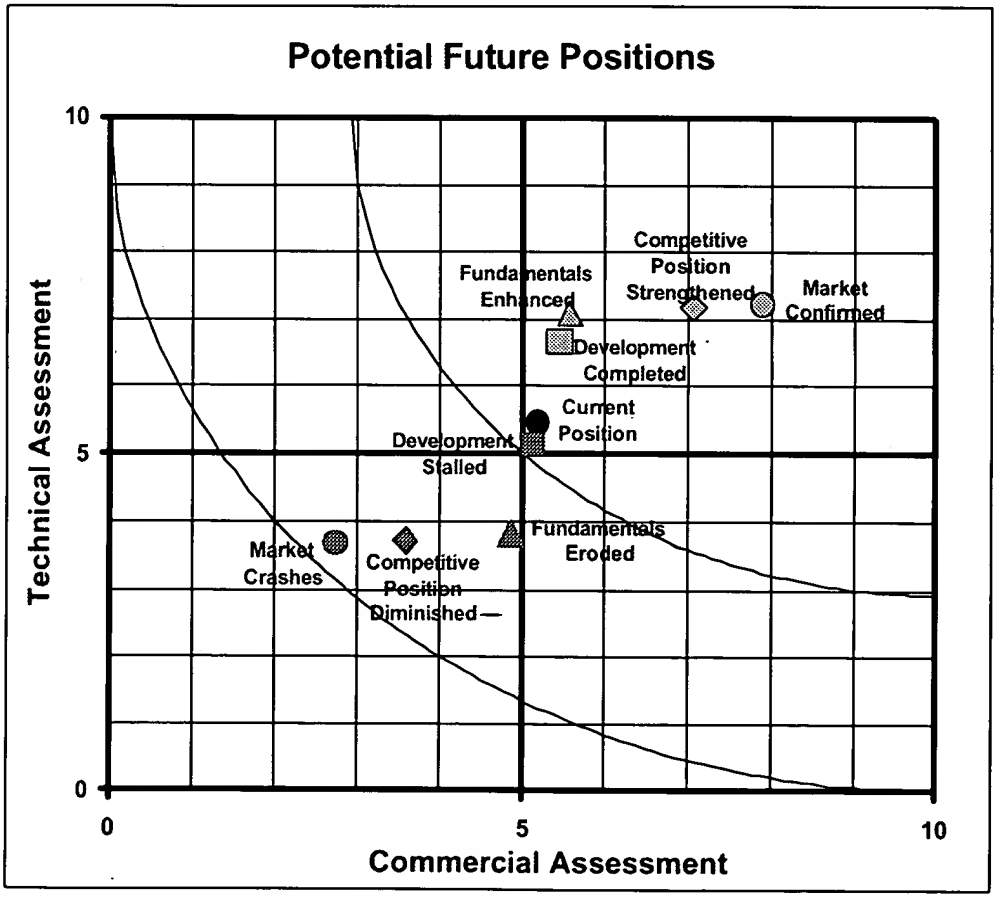
Similarly, it is feasible to estimate what downsides might occur if certain events do not work out as expected.

Future value = Current value (B, C, or D) - increment (x, y *or* z)

Where x is the number of deterioration steps which the asset is likely to experience if its current position is at level B, y is the number of deterioration steps that the asset is likely to experience if its current position is at level C, and z is the number of deterioration steps the asset is likely to experience if its current position is at level D.

The individual criteria in ProGrid-TA can be grouped into various categories, such as those that affect the technical development program, project fundamentals, competitive position and market confirmation. Applying the sensitivity analysis to each category results in an S curve plot as shown in the following chart. The expert system can be constructed to produce a list of actions required to achieve the upsides and a list of areas to address to protect against the downsides.

Undertaking the ProGrid assessment at periodic intervals will show the level of progress that has been made.



4.9 The Assessment Process

The ProGrid-TA technology assessment procedure is best carried out by a small panel of people knowledgeable about the technology/market to be assessed. This normally will include individuals representing the technology developers, the commercialization team, and preferably one or two individuals who are not part of these two groups but whose participation will add credibility to the process.

A trained facilitator adds considerable value to the assessment by ensuring that the assessment decisions are consistent and well supported. It is essential that agreement is reached regarding the specifics of the technology being assessed and the markets to be served. The facilitator provides documents to support the assessment process.

4.10 Looking Beyond Technology/Markets (ProGrid-CS)

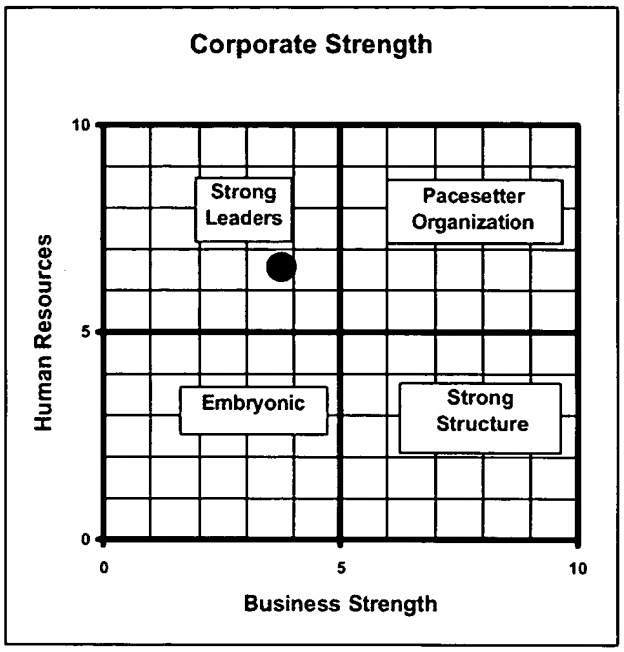
Venture Capital companies have historically placed pre-eminent importance on the quality of the management team in start-up companies. They have learned to make accurate judgements about the capability of the commercializing team based on a few observations- essentially a "gut feel" about the quality and commitment of the principals.

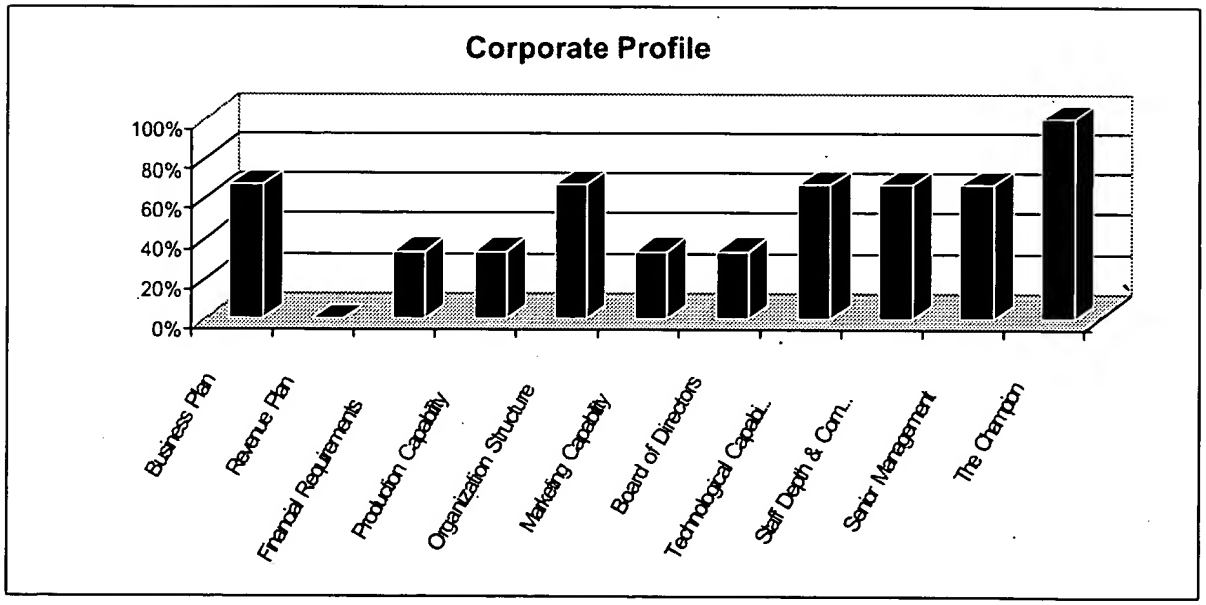
The ProGrid-TA approach uses a different sequence regarding a new venture; if the technical assets are strong and a viable market exists, then the venture deserves closer examination regardless of the current strengths and weaknesses of the commercializing organization. This approach provides the opportunity to add value by facilitating the addition of the missing components. If the ProGrid-TA assessment is encouraging, a companion tool called ProGrid-CS can be employed to determine the capacity of the commercialization organization and its strengths and weaknesses.

Eleven criteria are used in the assessment, as shown in the following matrix. Column A includes the factors related to people resources, Column C factors related to the strength of the business and Column B the connecting factors that are needed to link the human resources to the business opportunity.

A ***The People***	*B* ***The Connectors***	*C* ***The Business***
The Champion	*Board of Directors*	*Revenue Plan*
Team Depth and Commitment	*Business Plan*	*Marketing and Sales Capability*
Senior Management	*Organization Structure*	*Financial Requirements Plan*
	Technological Capability	*Production Capability*

The example shown in the following two charts illustrate the situation of an organization with strong people skills but with gaps in organizational capacity, particularly in production and marketing and in the lack of a credible revenue plan. ProGrid-CS is a rapid first look at a company, which is more fully analysed in the tool described in Chapter 6, ProGrid-CO.





Chapter 5: Benchmarking R&D (ProGrid-RO)

5.1 Introduction

Many research organizations have evolved during the past thirty years from organizations focused primarily on long-term research flowing from relatively rigid missions to those that now have flexible mandates aligned to the changing needs of a variety of clients. The concept of performance measurement has changed dramatically from the time when scientific excellence was the primary criterion for success. This evolution has not been linear and has involved a number of different relationships between R&D organizations and the stakeholders served. This chapter traces the evolution through various stages, and relates these to the types of performance measurement and benchmarking practices that have been used.

Meeting both the short and long-term expectations of stakeholders has repeatedly been identified as one of the major challenges facing research managers. This issue can be represented as the balance between the use of existing intellectual capital to meet the current business needs of clients and the renewal of the bank of intellectual capital to ensure long-term survival. ProGrid-RO was developed to assess how well an R&D organization balances these competing demands.

5.2 The Development of ProGrid-RO

In the 1980s, the author undertook a series of cost/benefit analyses of various research programs.[10] The decision to undertake these analyses was in large part a response to outside pressures, frequently at times of organizational stress. A more systemic and rigorous methodology was developed in the early 1990s involving a matrix of performance areas, ranging from those in complete control of the R&D organization to those involving interactions with the owner, clients and external stakeholders.[11]

The next step was the development of a mathematical framework to more quantitatively identify the performance level of an organization, for tracking performance over time and for comparing similar organizations.[12] The method recognizes that there are frequently two major overarching criteria for successful organizations, equivalent to short-term and long-term performance. This led to the concept of a performance grid with these two criteria as the axes.

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[10] Research at Esso - Sixty Years of Practice - Organizing for the Future, C.W. Bowman, Submission for the 23rd Conference of the Canadian Research Management Association, Jasper, Alberta, September 22-25, 1985

[11] Measuring Good Research Management, Research &Technology Management, March-April 1992, Volume 35 No.2, p 13.

[12] Benchmarking Research Performance, R. S. Jane Memorial Lecture, Canadian Society for Chemical Engineering Conference, Oct 3-6, 1993

Recognizing that short and long-term horizons are surrogate terms for the use and generation of intellectual capital, respectively, these latter terms are now used as the defined axes of the performance grid.

5.3 Evolving R&D Practices

R&D organizations have evolved during the past three decades, reflecting in large measure the degree to which they align themselves with business cost centres. It is useful to define two "bookend" types of organizations to illustrate the changing relationships.

Type X Organizations- Organizations whose mandate is determined solely by the current business interests of clients and who hire staff and select and monitor projects on this basis. Deliverables are closely defined and the technology is transferred under contractual relationships within a corporate envelope. Although effective at meeting the needs of clients, these organizations frequently have difficulty adding to their intellectual capital.

Type Y Organizations- Organizations whose mandate is defined by a scientific charter and who hire staff and select and monitor projects based on meeting the objectives of this charter. Specific deliverables are generally not defined and technical information is made available through publications to the broad scientific network. Although effective at creating intellectual capital, these organizations are usually not involved in the commercial use of this capital.

The evolution can be described on a positioning grid with the use of intellectual capital and the generation of intellectual capital employed as grid axes, as shown in the charts on the following page.

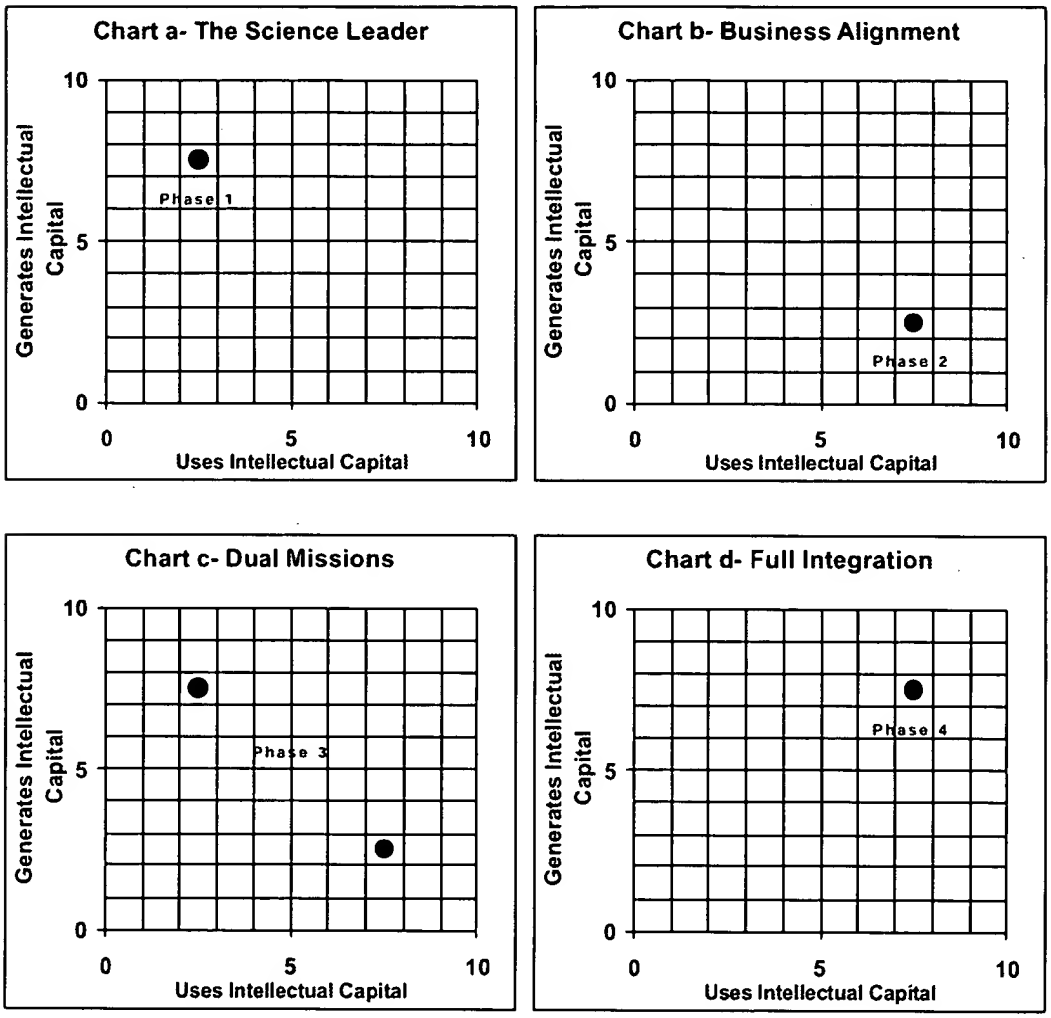
Phase 1 - The Science Leader- Type Y Organization (Chart a)

Organizations in Phase 1 received essentially all their funding as a core "grant" from the owner, with only a general statement of expected deliverables. "Good science", supported by access to the world pool of science and technological information, was the driver for R&D programs. These organizations were generally successful in generating new intellectual capital, which frequently resulted in new processes, products or services having significant technological impact. However, the transfer of technology to clients tended to be sporadic and dependent on the personal relationships developed by senior R&D management with counterparts in the business units. Central corporate research laboratories during the 1960s had strong Type Y characteristics.

Phase 2 - Business Alignment- Type X Organization (Chart b)

Many owners became dissatisfied with the impact of Phase 1 organizations, and moved to an arrangement whereby R&D contracts were provided directly from the business cost centres. The programs were approved by and in many cases almost entirely defined by these centres. R&D projects were short-term and responded to the current needs of the

business, with limited attention to global technology developments. The benefits of R&D were determined through periodic audits of successful projects. These organizations, although effective at technology transfer, were less effective at replacing their depleting intellectual capacity. This situation was prevalent with many industrial research organizations during the 1970s.



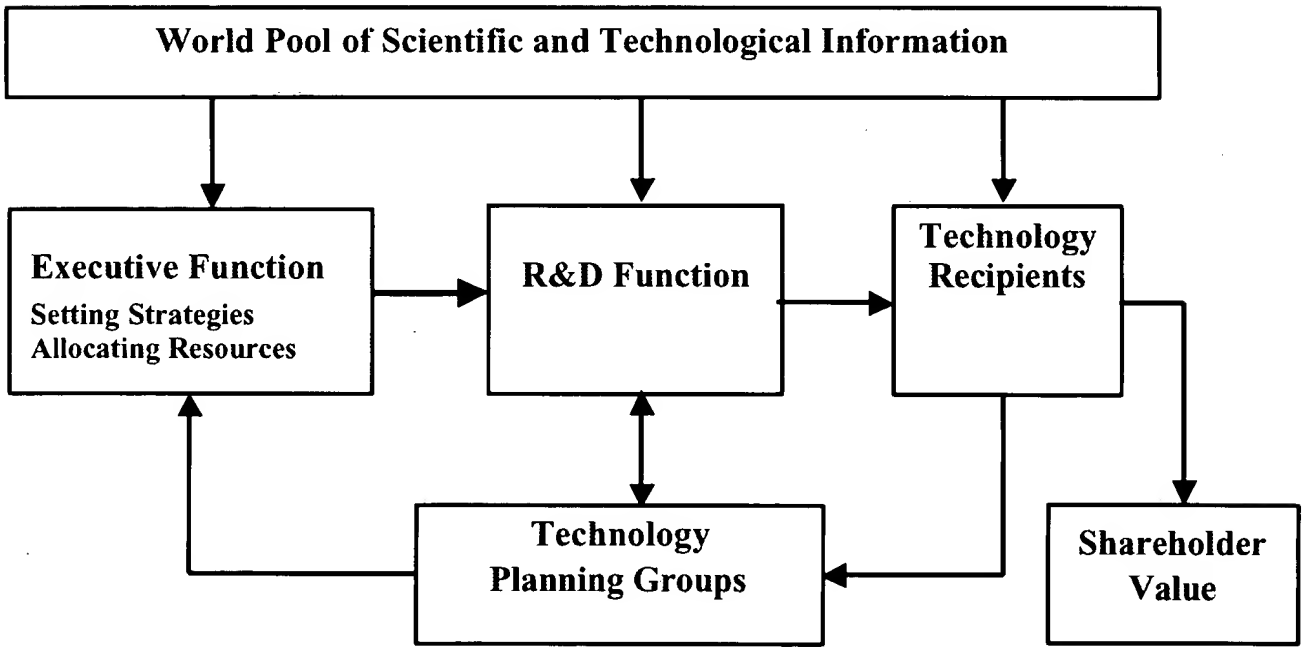
Phase 3 - Dual Missions- Type X + Type Y Organization (Chart c)

Owners generally felt more comfortable with Phase 2 results, but were concerned that there were opportunities and threats not being addressed by this focus on the short-term needs of the business units. Some owners reinstated a modest level of corporate funding for longer-term R&D, with the selection of projects largely residing with the R&D organization for that component of the total budget. The business lines still provided the majority of the funding for the organization. The management process for the short and long-term missions were not integrated. Whether this dual mission approach was effective is debatable. It did provide research management some discretion to initiate

exploratory programs, but the capacity to expand these when successful was limited. A number of industrial research organizations adopted this strategy in the 1980s.

Phase 4 – Full Integration- Type X/Y Organization (Chart d)

Most companies realized in the late 1980s that they were entering a new fiercely competitive global economy in which technology would become a key strategic weapon. It became imperative that technology be fully integrated into the corporate strategic plan. It is necessary to involve senior levels of both business and research management in this process and to focus on both the short and long-term technology needs of the corporation. An attempt has been made to illustrate how this level of integration might occur in the following chart. This shows the development and commercialization of technology as an integrated system in which the owners establish strategies and allocate resources. Technology recipients are actively involved in the definition of program elements. The impact of the external world pool of technology is felt by all participants, not just the R&D organization. An aggressive R&D management unit is needed to energize this process.



5.4 The ProGrid-RO Methodology

ProGrid was developed to benchmark how R&D organizations performed in each phase of development and to plot the route to Phase 4 where appropriate.

The problem with most evaluation approaches is that they tend to be qualitative in nature, introduced by external consultants and generally applied as one-time events. There is a tendency to relapse into old practices once the enthusiasm for change has diminished. Unless the changes become an integral part of internal processes and embedded into the culture of the organization, there is a high risk of losing the gains that have been made. What is needed is a method that provides a mathematical framework for quantitatively measuring an "intangible" asset. A desired attribute would be a methodology which itself learns and improves through experience.

ProGrid-RO defines the current position of an organization with respect to the use of and the generation of intellectual capital. It has now been used in five countries for 30 different organizations. A sizable database has been accumulated.

The key outputs are "Direction" and "Distance from Goal". These lead to actions for any needed course correction and also provide an indication of how far an organization is from its own perception of "high performance".

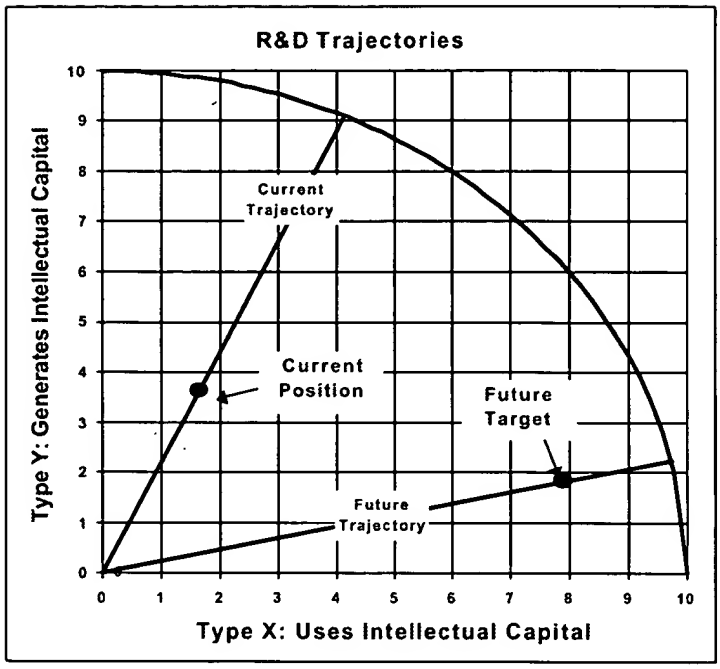
The ProGrid results are displayed in chart form. There is no single correct position on the charts- there is only the "right" position for an organization in reference to its mandate and mission. The procedure is a self-assessment process and can be considered as a "self-satisfaction" survey. Once used, the procedure can then be adapted to track future progress.

5.5 Setting the Direction- Module 1

Through the application of Module 1, a trajectory for an organization is determined on a grid that has Type X and Type Y characteristics as the axes. The current trajectory is determined and if a course change is desired, a preferred future trajectory is also defined. The trajectory is determined by the selection of statements related to:

Organization mandate	Monitoring R&D Projects
Budget Sources	Staff Deliverables
Hiring Strategy	Technology transfer
Selecting R&D Projects	Networking

The statements have been prepared to describe the nature of organizations ranging from pure Type X behaviour to pure Type Y behaviour in a set of five steps. (This is the only ProGrid tool that does not use an even number of steps in the ladder. For Module 1, the levels in the ladder are not judgmental and the reason for using an even number of steps does not apply). Depending on the statements selected, the trajectory on the grid is uniquely determined. An example of this is shown in the chart on the following page. This illustrates an extreme example in which an organization currently having dominantly Type Y characteristics wishes to shift to become a strong Type X organization.



5.6 The Current and Desired Future Positions- Module 2

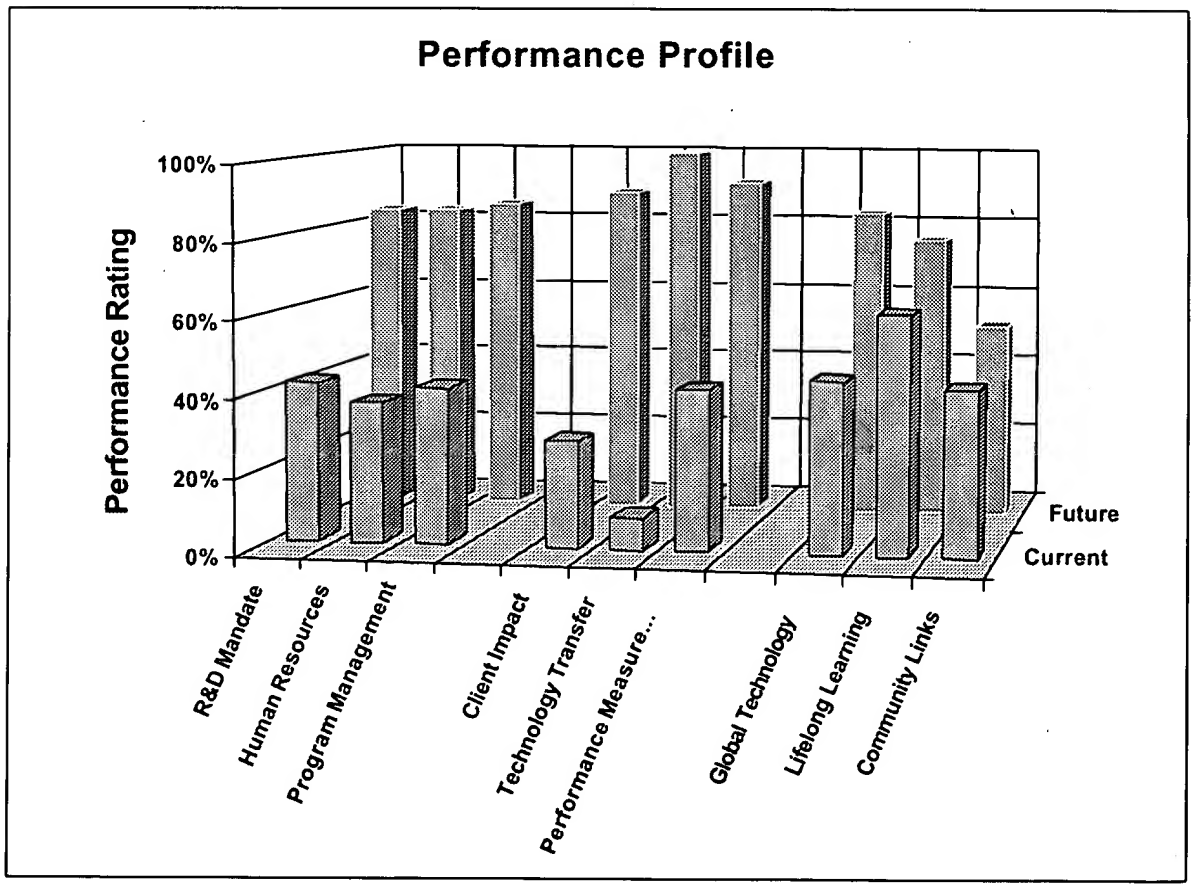
Module 2 measures the extent to which an organization adheres to a set of practices, grouped into the nine cells shown in the following matrix. Column A includes the practices that are largely in the control of the research organization. The practices that involve interactions with the owner and clients are in Column B and those that involve external interactions are in Column C.

A *Inside The R&D Organization*	*B* *Inside The Client's Corporation*	*C* *The External World*
Establishing the R&D Mandate	*Client Linkages*	*Accessing Global Technology*
Human Resource Practices	*Technology Transfer*	*Promoting Lifelong Learning*
Program Management	*Performance Measurement*	*Linking to the Community*

These cells contain a number of performance criteria, each having a set of four "performance levels". The highest level describes what is currently considered as the maximum level of achievement possible for that factor, based on the judgement of knowledgeable R&D managers who have contributed to the development of the methodology. The highest level does not necessarily represent a desired level for an organization. The highest level may be inconsistent with the mandate and purpose of an organization.

Based on the selections made by the organization, a position is determined on the trajectory defined in Module 1, and the distance traveled to date and the distance to the preferred future state is also defined (see previous chart).

Once the trajectories and current and desired future positions are defined, examination of the individual statements that have been selected will lead to an action plan designed to change course and achieve the target position. It is useful to calculate the "scores" obtained in each of the nine cells in the original matrix, as shown in the following profile chart. This assists in developing an action plan to achieve the desired future state.

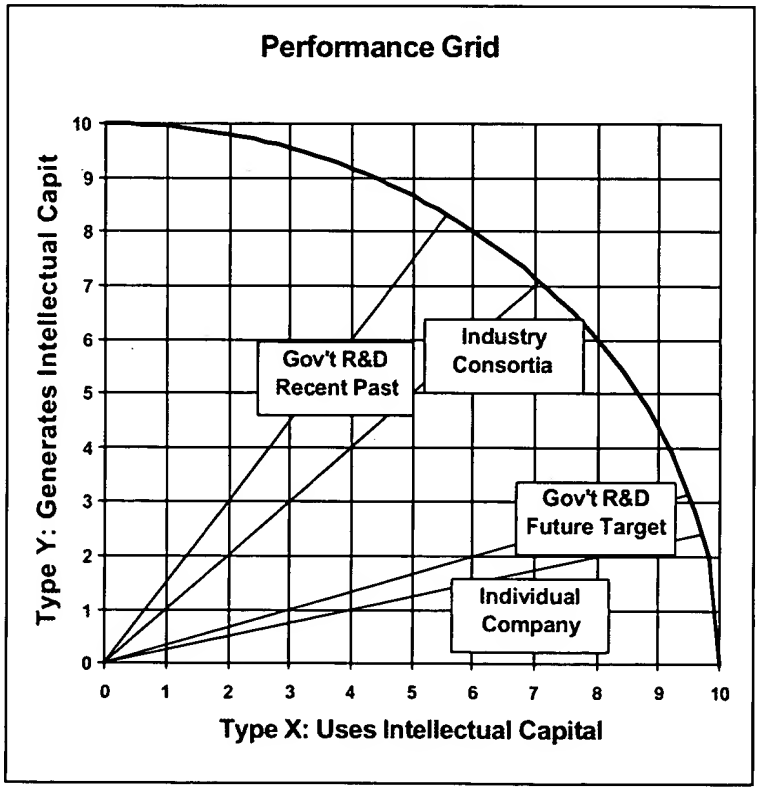


5.7 Case Studies

Approximately thirty R&D organizations have participated in projects that have included the use of the above "Best Practices" assessment process. Five types of organizations have been involved.

1. Private Sector- Single Company
2. Private Sector- Consortia
3. Government Laboratories- Industrial Sector Related
4. Government Laboratories – General Industrial Support
5. Government Laboratories- Science/Technology Focused

Although the results are proprietary to the specific organizations involved, one major conclusion was reached that can be more broadly shared. This is illustrated in the chart below. Many government R&D organizations currently position themselves in a zone where they put more emphasis on the generation of intellectual capital than on its use. Individual companies place themselves more strongly in a zone where the use of intellectual capital is the more dominant focus.



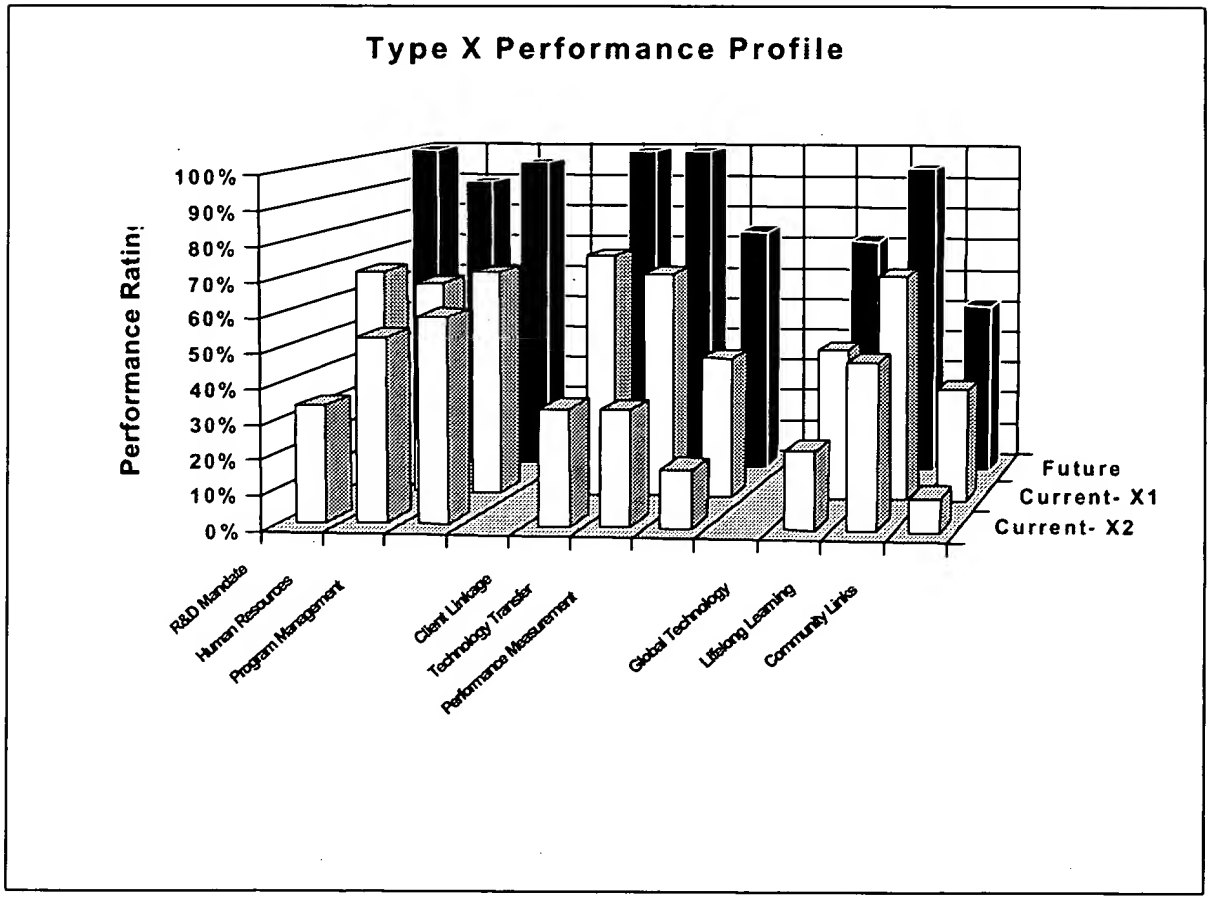
Neither of these entities is entirely satisfied with its current position. Many companies have coalesced around R&D consortia in order to achieve a better balance in short and long term activities, as shown by the Industry Consortia position. Government laboratories on the other hand are attempting to become more responsive to the needs of

clients and identify as a target a position closer to the current position of individual companies. It is unlikely that government laboratories can put in place the necessary tight linkages among a broad range of clients to achieve this position. More importantly it raises the question as to whether they will so weaken their position for generating intellectual capital that they will cease to perform the mission for which they were established.

The chart below displays the profile of typical Type X organizations, with the practices grouped by individual matrix cells.

Type X1- A Type X organization with relatively strong ratings across most of the profile, in particular linkages to its clients. Areas identified for attention are improved performance measurement and better access to global technology. Linkages to the external non-client community are not seen as a key factor for this type of organization.

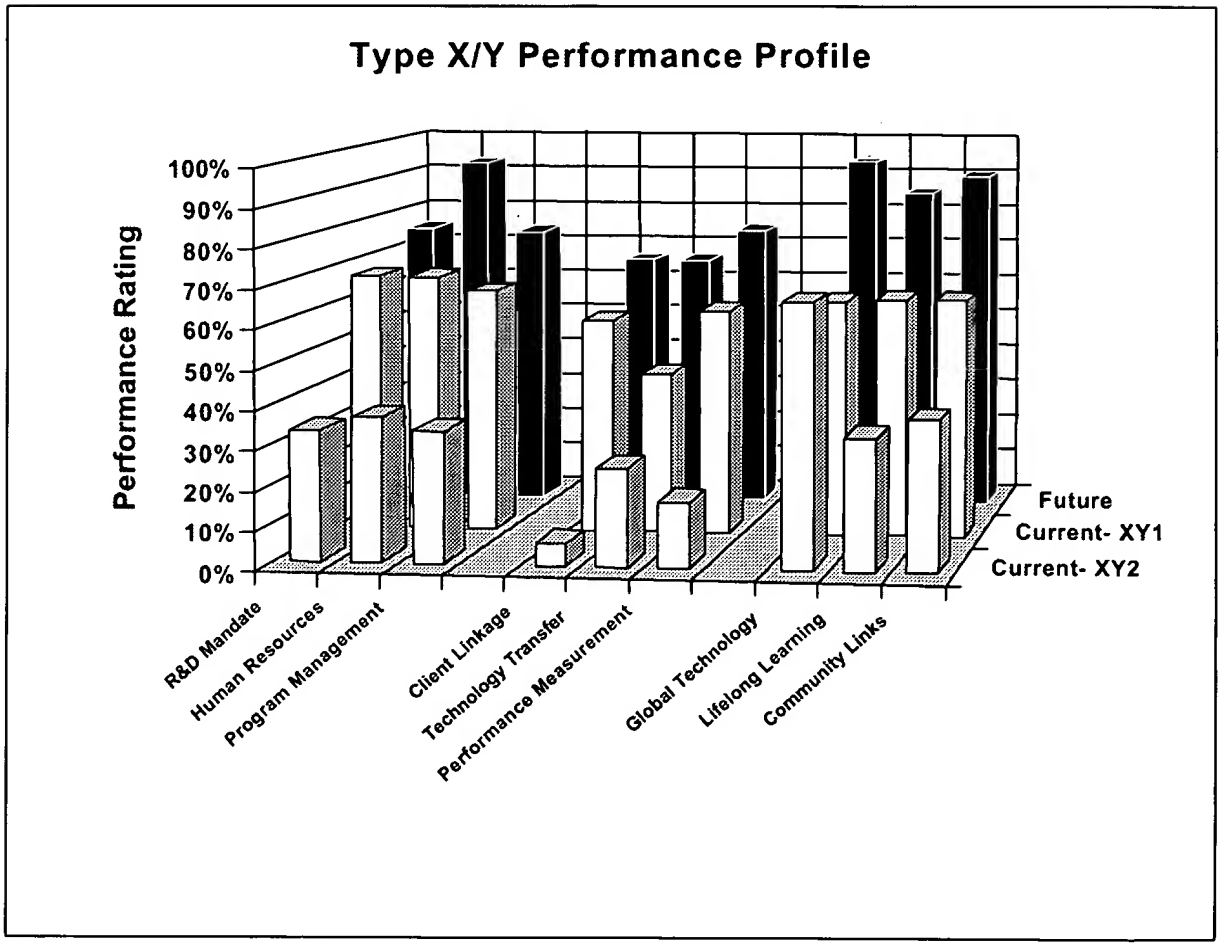
Type X2- A Type X organization with relatively poor links to its clients. None of the practice areas are strong, indicating that this organization has not yet undertaken a serious upgrade in its operations in response to competitive pressures. This position would likely not be sustainable in the long term.



The chart below displays the profile of typical organizations that have both Type X and type Y characteristics, with the practices grouped by individual matrix cells.

Type XY1- A mixed Type X and Y organization with solid strength across the profile. The organization has been able to put in place the longer-term programs characteristic of Type Y organizations, without detracting from its client linkages. This is a typical situation for industry consortia. Linkages outside the client community are seen as important, for example in representing the interests of the members of the consortia to the government and the general public.

Type XY2- A mixed Type X and Y organization with strong links to the global R&D community active in its field of research. However, if the organization is operating largely with client derived revenues, as many were in the studies that have been carried out, the poorly developed links with these clients cast doubt on the continued flow of these revenues. This position is probably not sustainable in the long term.



5.8 Alternative Evaluation Matrices

The set-piece ProGrid-RO tool described above can be modified to fit individual user needs. For example, if an organization wishes to be more explicit in its commercial impact, the evaluation matrix can be amended to provide more direct evidence of this impact.

In the example shown below, a new cell measuring the level of corporate impact has been added. The thrust of several other cells has been adjusted to adapt to this change.

With the appropriate Language Ladder changes, grid and profile bar charts can be produced analogous to those presented in the previous sections.

A *Setting the Stage*	*B* *Undertaking the Task*	*C* *Making the Impact*
Vision *Mission* *Mandate*	*Business Relevance*	*Technology Acquisition/ Transfer*
Human Resources	*Program Management*	*Corporate Impact*
Lifelong Learning	*Performance Measurement*	*Public/ Community Impact*

5.9 What Has Been Learned?

1. Industrial R&D organizations have evolved through a series of phases during the past few decades, involving a transition from a "corporate" status remote from day to day company operations to a position of close linkage to specific business cost centres. The final stage in this transformation is the acceptance of the R&D entity as a full partner in developing the strategic intent of the company.

2. The above evolution has paralleled a realization that the intellectual capital of a company has become more important than its physical assets. The R&D organization has become a key participant in the generation and use of a company's intellectual capital.

3. Intellectual Capital can be defined as the summation of intellectual property, codified knowledge, systems and processes and human resources. One approach for measuring intellectual capital is to examine the practices that an organization uses in managing these four asset categories.

4. In benchmarking R&D organizations, the stage at which the organization has progressed and its specific mandate and mission must be clearly defined. The expectations of the owner and other principal stakeholders must be reflected in any benchmarking study.

5. The ProGrid-RO methodology assesses the practices of an R&D organization, in comparison with leading pacesetter "best practices". The procedure measures the extent to which an organization adopts practices appropriate for the use of intellectual capital (Type X) and practices appropriate for the generation of intellectual capital (Type Y).

6. One of the major findings from the studies completed to date is the paradox of "shifting missions". Many government R&D organizations are in transition from a focus on generating intellectual capital to a position where they are more closely linked with clients in the use of intellectual capital to solve short-term problems. Meanwhile, many companies, having made that same transition in the past two decades are now realizing that this has been at the expense of protecting their long-term competitive position. These companies have now formed consortia in various sectors to collaborate in the renewal of their base of intellectual capital.

7. Case studies have identified the practices that Type X and mixed Type XY organizations require to ensure long-term success. Organizations which lack strength in these key practices may not be sustainable.

8. Those who have used the ProGrid-RO tool have found it to have a number of key advantages, which include:

    - Ensures that all key aspects have been addressed (open architecture)
    - Establishes a "Language Ladder" process for assessing practices (essentially a "calibration" procedure)
    - Achieves consensus- provides input from all stakeholders
    - Tracks performance over time (separates "activities" and "progress")
    - Provides disciplined and reproducible results
    - Graphical and easily understood
    - A self-learning methodology, constantly improving

Chapter 6: Company Performance (ProGrid-CO)

6.1 Introduction

ProGrid-CO is a method for assessing the performance of a company with respect to its ability to achieve its vision and to meet its strategic plan.

The methodology can be applied in several different ways, including:

- By individual managers to compare views and perspectives
- By a management group to seek consensus on critical issues
- At various levels in an organization to assess consistency in the application of various management practices
- Among organizations to compare experiences and learnings

The procedure evaluates a company with respect to two principal criteria: (a) organizational excellence and (b) the business opportunity. The inability of some companies to make the transformations required to ensure sustainability is a major cause for corporate failure. A powerful feature of the ProGrid-CO methodology is the identification of both the current and desired future states, and an accompanying set of actions. The methodology has two key deliverables- (a) the location of the company on a grid that defines its status with respect to the two principal criteria noted above, and (b) a performance profile which identifies specific strengths and weaknesses. These two outputs set the stage for the development of an effective strategy designed to improve future performance.

Development of the ProGrid-CO tool involved the standard five ProGrid steps:

Step 1- Define a series of evaluation criteria with respect to which the performance is to be measured.
Step 2- Select two of these as the overarching criteria that if both achieved yield the highest possible performance level for the company. As noted above, organizational excellence and the business opportunity have proven to be effective overarching criteria. Construct an evaluation grid that has these criteria as the axes.
Step 3- Organize the remaining criteria into a matrix, each cell of which contains related criteria.
Step 4- Establish a series of quality or performance levels for each criteria in the matrix. In ProGrid terminology, these levels comprise the Language Ladder™ measurement system.
Step 5- Construct a bar graph that compares ratings for each of the matrix cells.

6.2 Evaluation Criteria

Discussions with various management consultants involved in assessing the performance of companies generated a large number of key criteria that were indicative of both short and long term commercial success.

Over time, the list has been modified to the following 58 criteria:

Clarity of Vision	Commitment to Goals
Clarity of Mission	Mission Focus
Auditing Performance Against Vision/Mission	Board of Directors
Shareholders	Organization Structure
Public Relations	Industry Relations
Champion	Senior Management
Staff Depth and Breadth	Succession Plan
Team Culture	Recruitment
Training	Recognition
Safety Program	Tracking Performance
Organization Improvement	Financial Plan
Revenue Plan	Capital Requirements
Overall Financial Strength	Return on Investment
Production Cost Position	Production Capacity
Raw Material Cost	Supplier Relationships
Goodwill	Marketing Plan
Market Channels	Customer Relationships
Technical Support	Patents/Copyrights
Competitive Intellectual Property (IP)	Trademarks
Know-how	Intellectual Capital Management
Business Plan	Plan Use and Validation
Operating Goals	Strategic Partners
Business Threats	Product Offering
Margins	Product Obsolescence
Product Improvements	Quality
Market Size	Market Penetration
Geographic Reach	Regulatory Environment
Competitive Situation	Competitive Intellectual Property Position
Competitive Dominating Business Factors	Competitive Financial Strength

6.3 Overarching Criteria

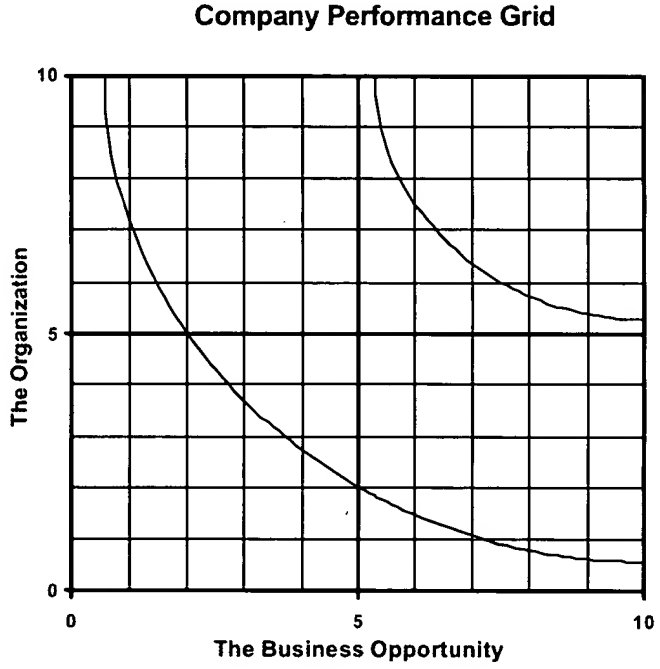
Most of the above criteria govern either or both the excellence of the organization or the potential of the business opportunity.

This led to the selection of the following two overarching criteria:

The Organization

The Business Opportunity

as the axes of the evaluation grid as shown in the following chart.



6.4 The Evaluation Matrix

The above criteria were grouped into clusters of related factors in the following matrix.

The columns in this matrix represent a progression from factors that largely influence the organizational strength of the company in Column A, to those that largely influence the business potential in Column C and those that are necessary factors to enable the organization to capture the business opportunity in Column B, the connecting factors.

A. The Organization	B. The Assets	C. The Business Opportunity
The Vision/Mission • Clarity of Vision • Commitment to Goals • Clarity of Mission • Mission Focus • Auditing Performance Against Vision/Mission	**The Financials** • Financial Plan • Revenue Plan • Capital Requirements • Overall Financial Strength • Return on Investment	**The Plan** • Business Plan • Plan Use and Validation • Operating Goals • Strategic Partners • Business Threats
The Leadership • Board of Directors • Shareholders • Organization Structure • Public Relations • Industry Relations	**Production Capability** • Production Cost Position • Production Capacity • Raw Material Cost • Supplier Relationships	**The Products** • Product Offering • Margins • Product Obsolescence • Product Improvements • Quality
The Team • Champion • Senior Management • Staff Depth and Breadth • Succession Plan • Team Culture	**Marketing System** • Goodwill • Marketing Plan • Market Channels • Customer Relationships • Technical Support	**The Market Opportunity** • Market Size • Market Penetration • Geographic Reach • Regulatory Environment
Processes and Practices • Recruitment • Training • Recognition • Safety Program • Tracking Performance • Organization Improvement	**Intellectual Capital (IC)** • Patents/Copyrights • Competitive Intellectual Property (IP) • Trademarks • Know-how • Intellectual Capital Management	**The Competition** • Competitive Situation • Intellectual Property Position • Dominating Business Factors • Financial Strength

6.5 The Language Ladder

This is the critical step that establishes the metrics of the ProGrid process. Through experience, it has been found that a set of four steps in the Language Ladder work well. The choice of an even number is important in that it reduces the tendency for evaluators who use the ProGrid methodology to migrate to the middle "neutral" position.

The following are two examples of Language Ladder statement sets that are used in the current ProGrid-CO procedure.

The Board of Directors

A. The organization has not yet been incorporated into the form necessary to conduct an ongoing successful business.
B. The organization has been incorporated and a Board of Directors established to meet legal requirements. The Board has not yet had any active role in the direction of the organization.
C. The organization has been incorporated and the members of the Board of Directors are well known in their fields of experience and have been able to provide guidance at legislatively required meetings of the Board.
D. The organization has an effective Board of Directors with a good balance of internal and external representation. Members of the Board actively participate in the affairs of the organization through frequent Board and Committee meetings.

Dominating Business Factors

With respect to the products/processes/services provided by this concept:

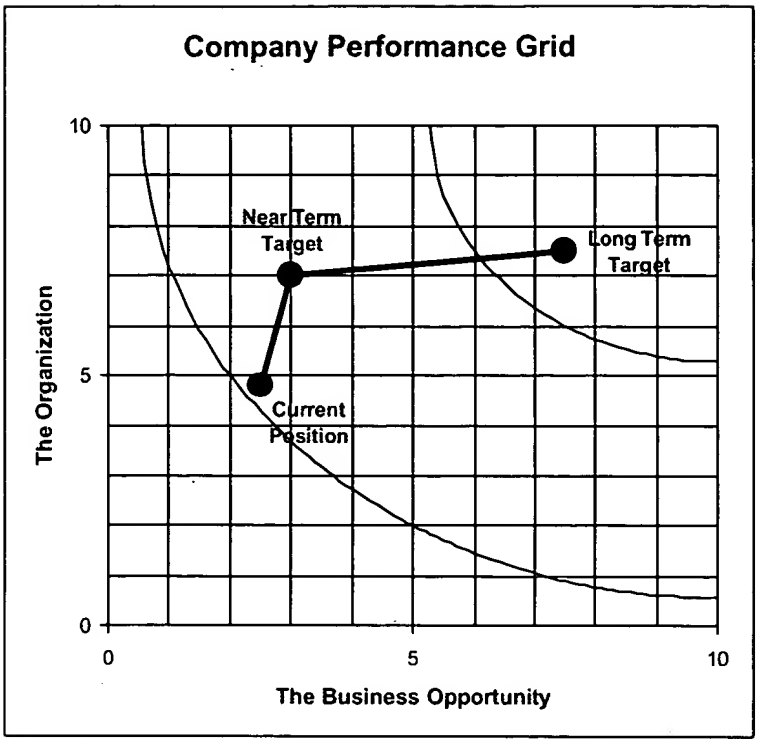
A. The competition has a dominant position in one or more key business factor(s), such as raw material cost, locked in contracts or restricted distribution channels, which will seriously restrict the entry of third parties.
B. The competition has in the past had a dominant position in one or more key business factor(s) but these can be effectively overcome by the organization, as defined in the business plan.
C. No competitor has a significant dominating business factor that will adversely affect the entry of third parties.
D. Competitors will be deterred by the organization's dominant position in one or more key business factors, such as raw material cost, locked in contracts or restricted distribution channel.

6.6 Evaluation Grid

Once a company has been evaluated using the ProGrid methodology, its position can be represented on the following grid, depending on the level of maturity of the organization's structure and practices and the potential of the business opportunity.

Both the current and the desired future position can be assessed. Once the long term target has been established, it is useful to subdivide the changes required into various stages, which could represent time targets as shown in this grid. Alternatively, targets that represent the contribution of individual departments in the organization could be defined.

This type of chart can be effective in tracking changes in the organization as a new strategic plan is implemented.



6.7 Interpreting the Grid Position

The position of an organization on the grid will be heavily dependent in its stage of development and past history, which can be captured in the following chart.

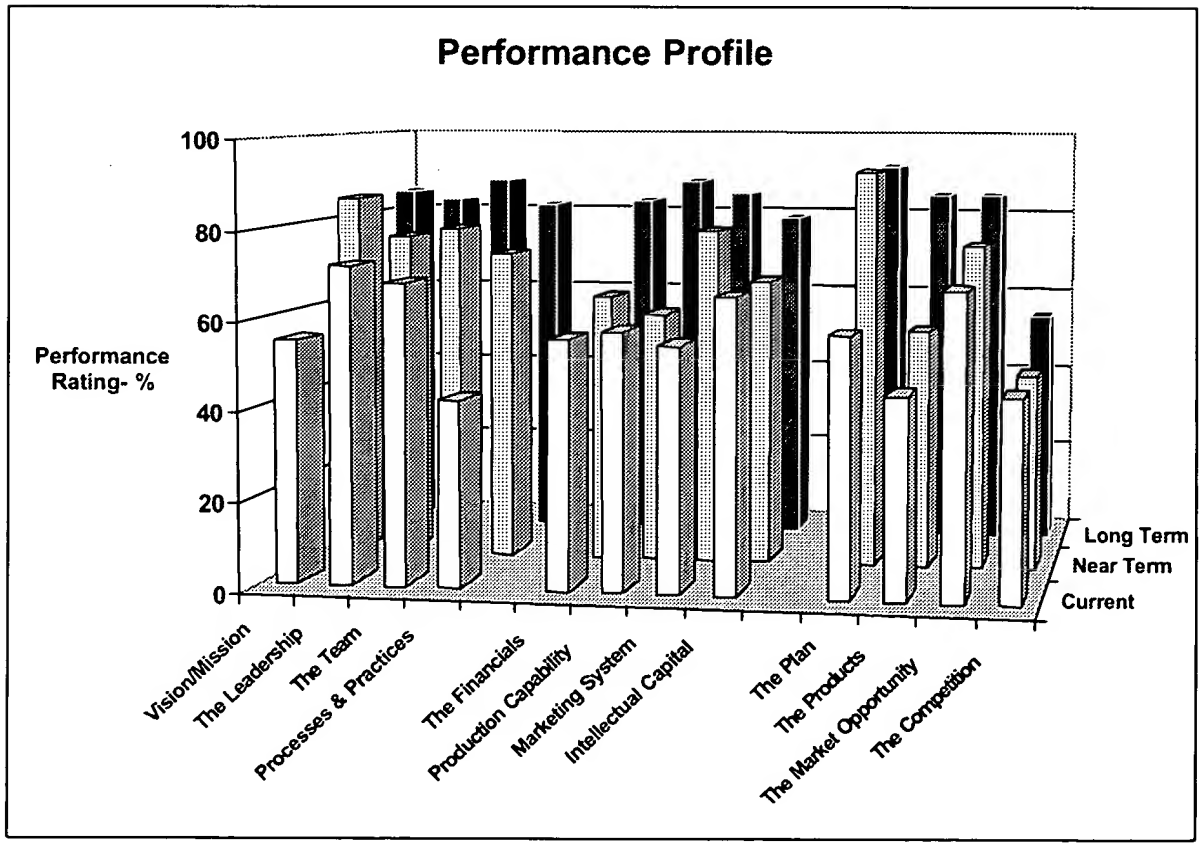
		Stage				
		Embryonic	Emerging	Growth	Stable	Decline
Service Companies	Information					
	Evaluation					
	Financial					
	Other Service					
Wealth Generators	Manufacturer					
	Marketing					
	Integrated					

Whether it is a direct wealth generator through the production of tradeable goods and services or whether it is has a service-supporting role will be important factors to consider in the analysis. The chart is a useful method of classifying a company and understanding the areas where particular strengths and weaknesses are critical.

6.8 The Profile Chart

In addition to the grid position, a bar chart of the strengths of individual cells in the evaluation matrix is an important output of the ProGrid methodology. This helps to identify the particular strengths and weaknesses of the company.

In the example shown, the company has near term work to do on the vision/mission and then to translate this into an effective Plan. There is also near term objectives related to some of the internal processes and practices and to enhancing the Marketing System. Longer-term goals include increasing production capacity and strengthening the slate of products.



Chapter 7: University Practices (ProGrid-UN)

7.1 Introduction

A university can undertake a self-assessment using ProGrid-UN (on a departmental and/or a total university basis) with respect to its principal missions of teaching and research excellence. The method differentiates universities that aspire to be leaders in the quality of teaching, that have research as their principal mission, or that seek to be pacesetters in both teaching and research excellence.

A powerful feature of this methodology is the identification of both the current position and the desired future state of the university, and an accompanying set of actions. There is no "right" position for all universities. The position of any particular university flows from its vision and mission statements.

The development of the ProGrid-UN methodology arose out of a University of Toronto initiative in 1994 to develop a new strategic plan. The objective of the plan was to place the University in the top quartile of North American universities in both teaching and research excellence. Many of the supporting criteria had already been identified in the strategic plan.

Development of the ProGrid-UN tool involved the standard five ProGrid steps:

Step 1- Define a series of evaluation criteria with respect to which the performance is to be measured.
Step 2- Select two of these as independent overarching criteria that if both achieved yield the highest possible performance of the university. As noted above, teaching and research excellence have been identified by the overarching criteria by some universities. Construct an evaluation grid that has these two criteria as the axes.
Step 3- Organize the remaining criteria into a matrix, each cell of which contains related criteria.
Step 4- Establish a series of quality or performance levels for each criteria in the matrix. In ProGrid terminology, these levels comprise the Language Ladder™ measurement system.
Step 5- Construct a bar graph that compares the ratings of each of the matrix cells.

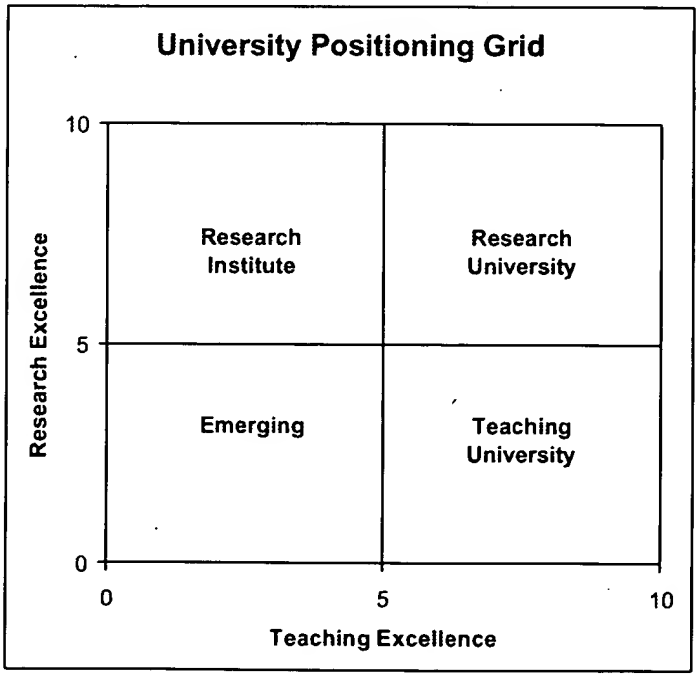
7.2 Evaluation Matrix

The strategic plans of several universities were reviewed in establishing the following matrix as the embodiment of their vision and mission. The industry and the community linkages are receiving increased attention, coincident with the increasing interest of society in the role of universities in knowledge-intensive economies.

A Undergraduate Programs	*B Graduate And Research Programs*	*C External Linkages*
Undergraduate Curriculum	*Graduate Program*	*Links Within The University*
Undergraduate Student Relations	*Research Program*	*Links To Other National And International Institutions*
Staff Development	*Research Support*	*Links To Industry And The Community*

7.3 Four-Quadrant Grid

Using the above two overarching criteria as grid axes results in the following evaluation grid. The four quadrants in this grid show different degrees of specialization, ranging from research institutes whose teaching role would be limited to specific post graduate programs to institutions whose primary emphasis is leading edge teaching practices with only a minimum research focus.



A University of Montreal staff member has suggested that a more fundamental description of the axes would be Generation of Information and Conservation of Information. These might better describe the purpose of research and teaching, and have some analogy to the generation of intellectual capital and use of intellectual capital described in Chapter 5.

7.4 Evaluation Criteria

With the help of a staff member of Curtin University in Western Australia, the following criteria were established within each cell of the Evaluation Matrix.

Under Column A- Undergraduate Programs

A1 Undergraduate Curriculum	*A2 Undergraduate Student Relations*	*A3 Staff Development*
1 Relevance of Curricula	*1 Entrance Qualifications*	*1 Credentials of Staff*
2 Cohesiveness of the Curricula	*2 Student Choice of Institution*	*2 Teaching Excellence*
3 Integration Among Courses	*3 Student Assessment of Staff*	*3 Promotion Ladder*
4 Curriculum Delivery	*4 Student Involvement in Governance*	*4 Hiring Practices*
5 Curriculum Accessibility	*5 Student Honours*	*5 Collegiality*
6 Laboratory Support	*6 Graduate Follow-up*	*6 Involvement in the Profession*
7 Adjunct Professors	*7 Student Support Program*	*7 Professional Development*
		8 Governance

Under Column B- Graduate and Research Programs

B1 Graduate Program	*B2 Research Program*	*B3 Research Support*
1 Overall Program Quality	*1 Quality of research*	*1 Facilities*
2 Graduate Courses	*2 Research Output*	*2 Skilled Trades*
3 Thesis Programs	*3 Research Focus*	*3 Computer Services*
4 Balance of Local/Regional/Foreign Graduates	*4 Funding Continuity*	*4 Information Services*
5 External Reviews	*5 Discretionary Funding*	
6 Retention Time		

Under Column C- External Linkages

C1 Links Within the University	*C2 Links to Other National and International Institutions*	*C3 Links to Industry and the Community*
1 Vision and Mission Alignment	*1 Visits and Staff Exchanges*	*1 Advisory Committees*
2 Evaluation Processes	*2 Joint Projects*	*2 Cooperative Projects*
3 Collaboration in Courses	*3 Twinning Arrangements*	*3 Courses for Industry*
4 Interdisciplinary Programs	*4 Equipment Sharing*	*4 Technology Transfer*
5 Joint Thesis Supervision		*5 Consulting Services*
		6 Satisfaction Surveys
		7 S&T Message

7.5 Language Ladder

For each of the above criteria, a set of four Language Ladder statements was established to provide the metrics for the evaluation system. The choice of an even number is important in that it reduces the tendency for evaluators who use the ProGrid methodology to migrate to the middle "neutral" position.

The following are two examples of Language Ladder statement sets that are used in the current ProGrid-UN procedure. These two examples are designed to be applied at a Departmental Level, but analogous statements can be developed at the University-wide level.

Relevance of Curricula

A. The curriculum was established more than ten years ago, largely on a discipline basis. Only minor changes to the curriculum have since been made.
B. The curriculum has had an internal review during the past five years and has been upgraded based on the findings of that review.
C. The curriculum has been reviewed by an external panel during the past five years and has been upgraded as a result of that review.
D. The curriculum is highly relevant to today's business and social needs and has been developed in close consultation with all major stakeholders, including industry, graduates and related research bodies. The curriculum is reviewed and upgraded on an ongoing basis.

Advisory Committees

A. The Department has not established an Advisory Committee to seek advice from major stakeholders.
B. The Department has established an Advisory Committee that has one or two industrial members. The committee meets infrequently and has not yet had any significant influence on the affairs of the Department.
C. The Department has established an Advisory Committee having strong industrial representation that meets on an irregular basis. Some of the recommendations from the committee have been adopted, but the committee has not yet had a major impact on the affairs of the Department.
D. The Department has established an active Advisory Committee having strong industrial representation that meets at least once a year. The recommendations of this committee have been adopted and contributed to the success of the Department. Although the Committee is Advisory, it is considered to be more like a Board of Directors by its members.

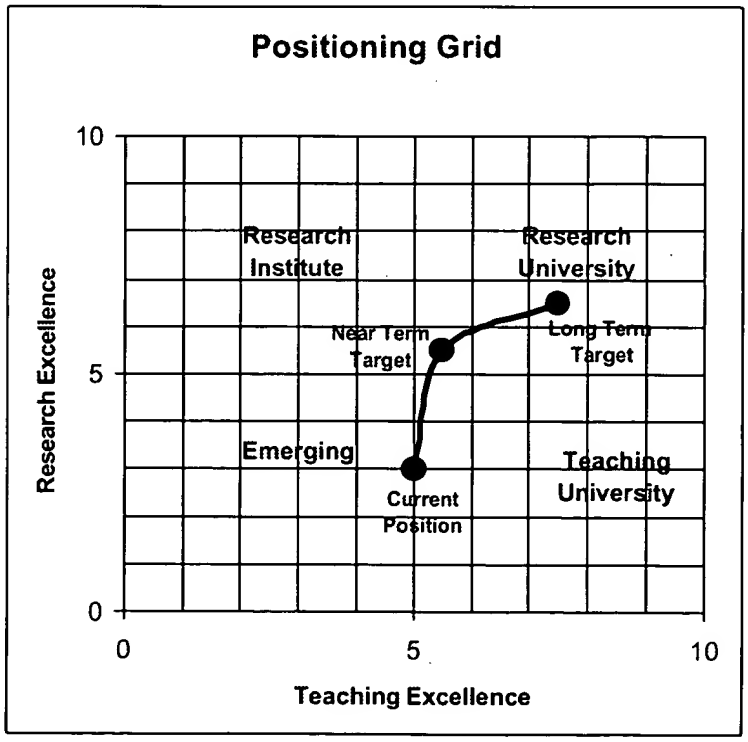
7.6 Carrying out the Assessment

The ProGrid-UN assessment would be best carried out as part of an overall strategic planning exercise. Specific components could be undertaken by various stakeholders, from the Board of Governors to representatives of the student body. At this time, there has been no detailed application of the ProGrid-UN methodology since the fundamental framework was developed.

7.7 The Evaluation Grid

Once a university has been evaluated using the ProGrid methodology, its position can be represented on the grid shown below.

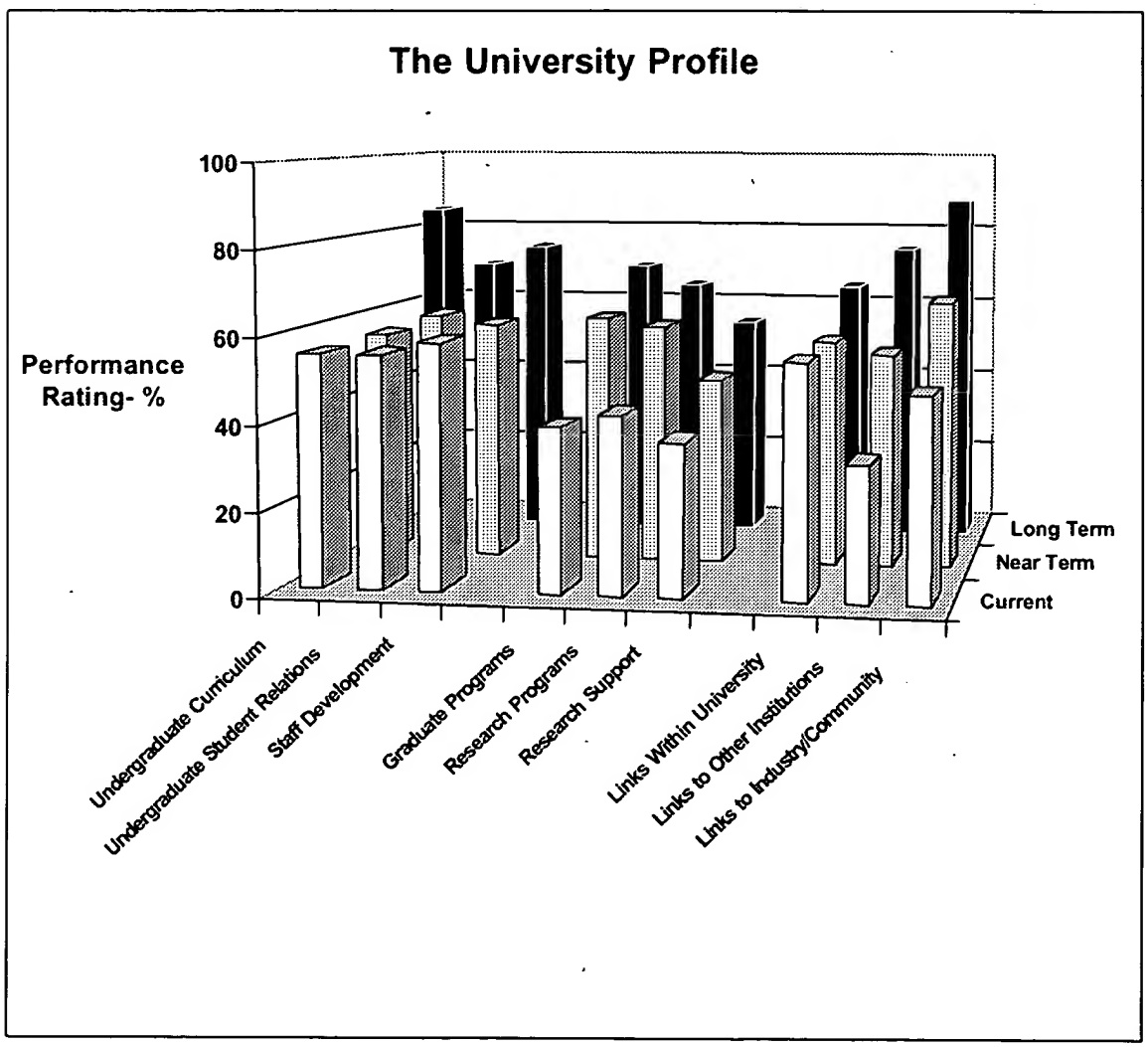
Both the current and the desired future position can be assessed. Once the long term target has been established, it is useful to subdivide the changes required into various stages, which could represent time targets as shown in this grid. This type of chart can be effective in tracking changes in the university as a new strategic plan is implemented.



7.8 The Profile Chart

The following profile chart provides more in-depth analysis of the affect of the new strategic plan and would be used in tracking performance.

The hypothetical example shown in these two charts is a university planning a near-term enhancement in its research focus, through enlarged graduate programs and the addition of leading edge researchers. Longer-term there will be more emphasis on reaching pacesetter teaching performance through techniques such as remote teaching services.



Chapter 8: Non-Technical Applications

8.1 Introduction

The concept of assessing intangibles using ProGrid methodology has application outside purely scientific and technical areas. The key factor is whether there are two overarching criteria that are independent of one another, i.e. both criteria can be met independent of the others.

One specific non-technical application discussed in this section is the measurement of the contribution of staff to the vision, mission and goals of the organization, for performance evaluation and/or compensation.

8.2 Personnel Performance Assessment (ProGrid-HR)

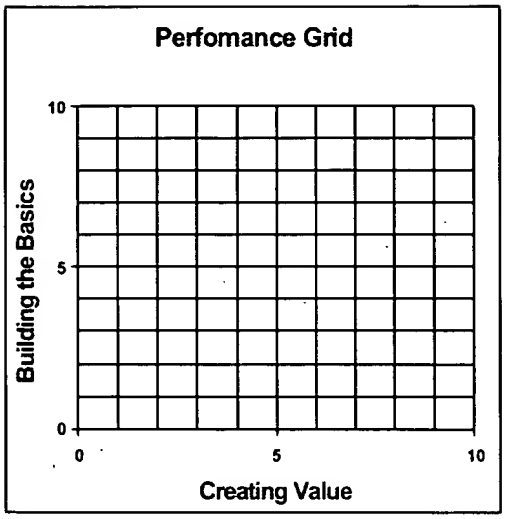
An illustrative example is that of consulting firms providing services to clients. These could, for example, be engineering or legal services.

Following the standard ProGrid approach, the criteria on which individual contributions are to be measured should first be identified. This must include every possible contribution that is valued by the organization. Unlike many of the other ProGrid applications, the objective is not to expect contributions across all criteria but to recognize high contributions in what may be in only a very few criteria, which may be recurring or one-time events, e.g. "spikes" of performance.

Once the criteria have been established, they should be organized in a typical ProGrid evaluation matrix in the form shown below. This example pertained to a consulting organization where both the development of tools to meet client needs and the work of delivering services to the clients were recognized.

The Basic Tools	*The Support*	*The Impact*
Acquired Expertise	*Administrative Support*	*New Business Secured*
Development of Advanced Processes/Products	*General Marketing Support*	*Participation in Projects*
Knowledge Integration	*Client Support*	*Strategic Impact*

This suggested that the two overarching performance criteria were "Building the Basics" and "Creating Value". These were selected as the axes of the performance grid as shown below.



8.3 Language Ladder Statements

Examples of two Language Ladder statement sets are provided below:

Development of Advanced Processes/Products

During the past assessment period, the staff member has:

A. Not been involved to any significant extent in the development of new advanced processes/products/services for the organization.
B. Has participated in the development and testing of at least one new advanced process/product/services.
C. Has played an important role in the development of new advanced processes/products/services, including conducting effective beta tests in a commercially relevant setting.
D. Has played a leadership role in the conception, construction and market testing of new advanced processes/products/services that fit well with known or prospective market needs.

Strategic Impact

During the assessment period, the staff member has:

A. Had little or no impact in formulating corporate strategies or achieving key strategic objectives.
B. Had some involvement in formulating corporate strategies and has supported some aspects of achieving key strategic objectives.

C. Been active in and has made significant contributions to certain aspects of corporate strategy formulation and the achievement of key strategic objectives.
D. Been a leader in both the formulation of strategies for the corporation and in achieving key strategic objectives.

8.4 Using the Procedure

The procedure can best be employed as a part of ongoing performance evaluation. In keeping with modern human resource practices, an initial self-assessment can be carried out using a prescribed form in which the employee selects his/her performance level in each cell of the matrix and provides a short justification for the selection. This can then be reviewed by a group of associates who may be in a supervisory, collegial, or supervised position with respect to the employee. This provides a group consensus by those who know most intimately the work of the employee.

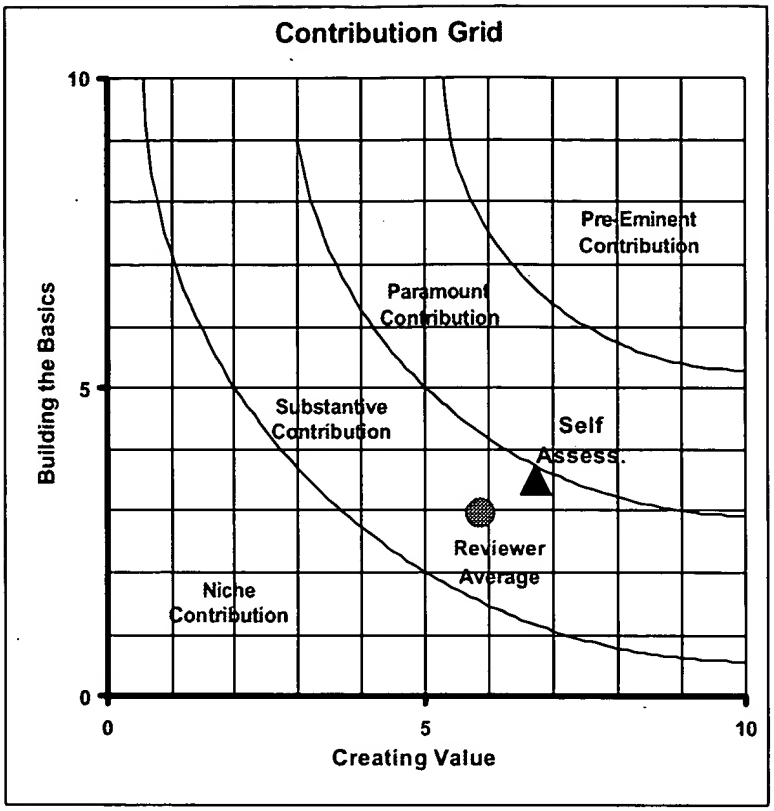
This assessment would then make an effective document for the employee and his/her supervisor to use in the regular performance appraisal.

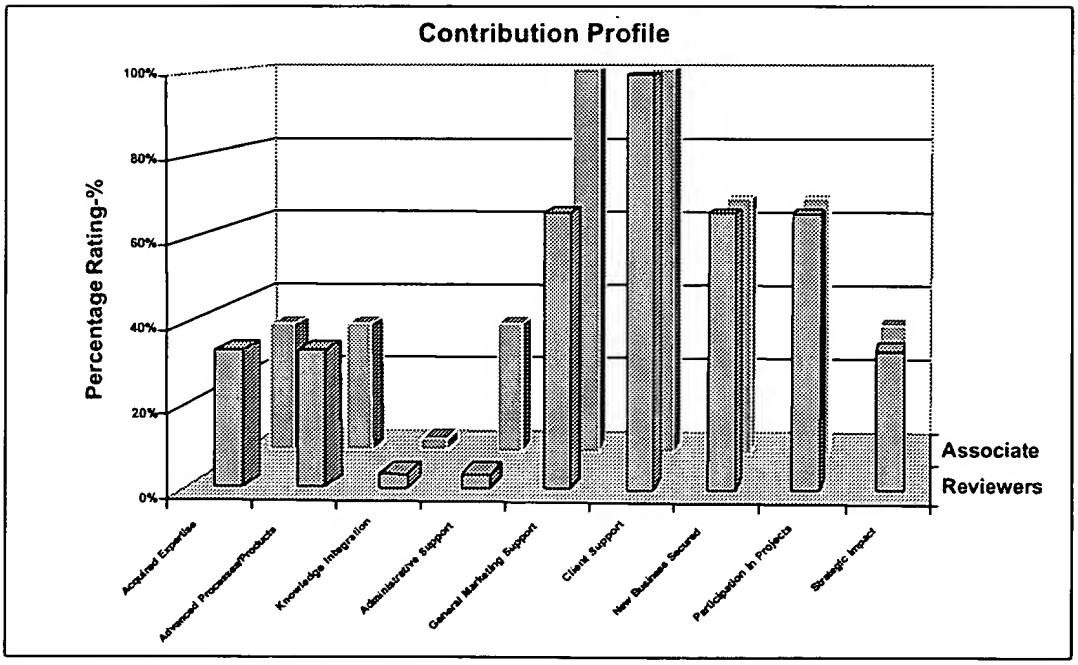
8.5 Contribution Charts

The two charts on the following page illustrate examples of the output from the assessment. The Compensation Grid shows the self-assessment by the staff member and the average assessment of the reviewers. The individual reviewer assessment can also be shown, if desired.

The descriptions of the zones in the Contribution Grid are illustrative only and would need to be customized to suit the practices and culture of the organization.

The profile chart identifies the areas of contribution and where there are differences between the staff member's ratings and those of the review team. In this example the staff member has made major contributions in marketing and client support and has brought in a significant amount of new business. Contributions to new products and services were not as dominant.





8.6 Other Applications

There are many other applications where a ProGrid-style tool could be effectively employed. Any selection processes where there are two independent criteria to balance are candidate areas. Possibilities include:

- Selecting sites for athletic events
- Selecting artistic awards
- Awarding charitable grants
- Recognizing individual achievements
- Selecting career paths
- Selecting entrance applications

In applying ProGrid to these application, it would be important not to prejudge the independent overarching criteria but to proceed though a process where all the values, priorities and expectations of the selecting agency are first defined and grouped, as outlined in the previous chapters of this manuscript.

There are many areas to explore in the hidden part of the iceberg!